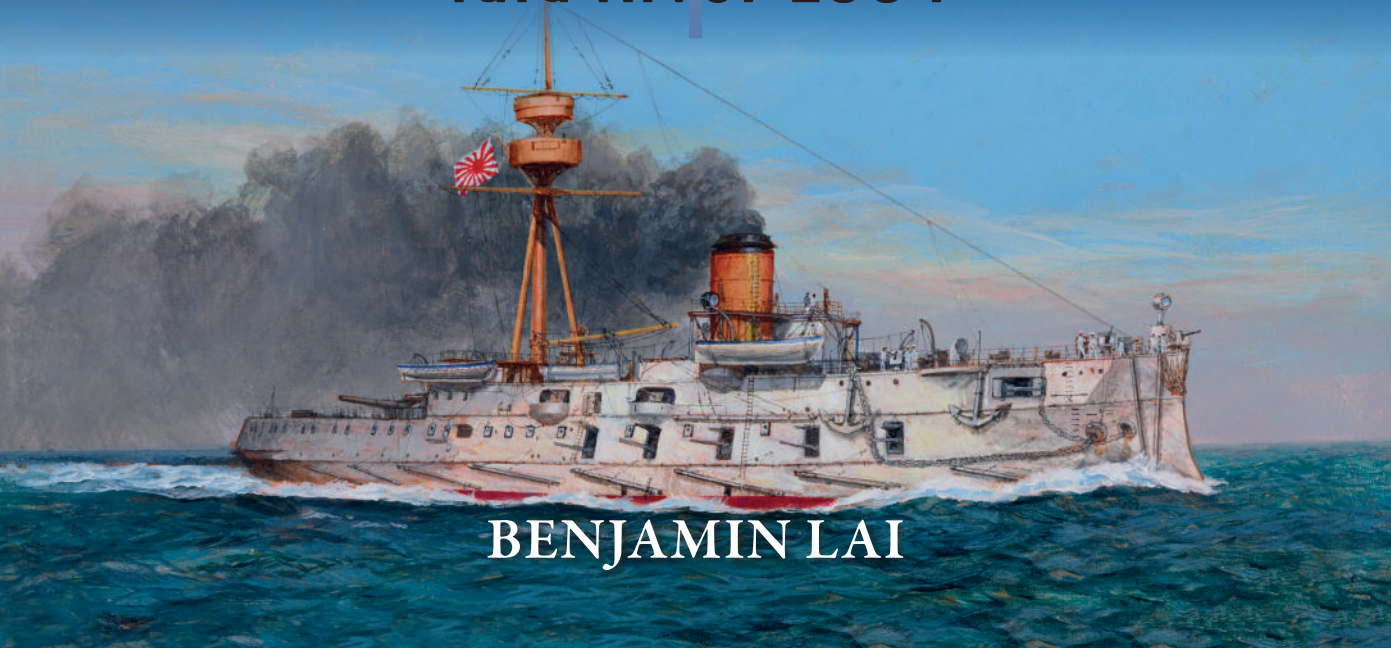




CHINESE BATTLESHIP **VS** JAPANESE CRUISER

Yalu River 1894



BENJAMIN LAI

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BENJAMIN LAI

CONTENTS

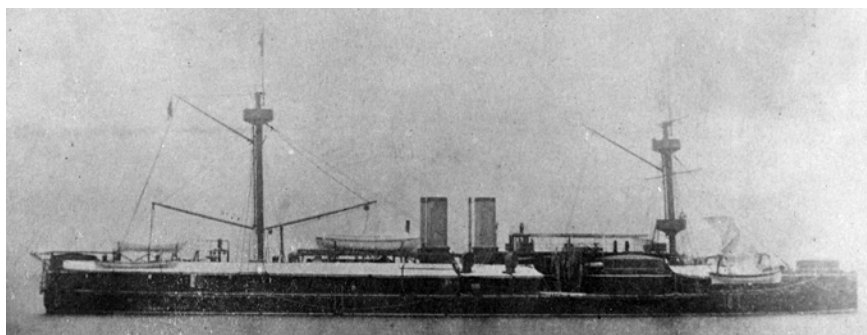
Introduction	4
Chronology	8
Design and Development	10
The Strategic Situation	23
Technical Specifications	28
The Combatants	42
Combat	50
Statistics and Analysis	66
Aftermath	75
Further Reading	79
Index	80

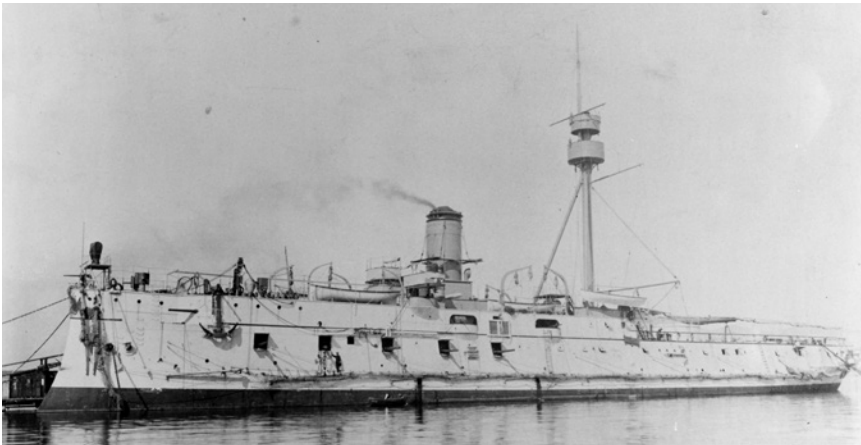
INTRODUCTION

In the early 1880s much of Asia, including Korea, was caught up in a ferment of political and economic reforms. It was a time when reformists fought conservatives, sometimes with bloody consequences. In December 1884, an attempted *coup d'état* launched by Korean reformers with Japanese support was put down by Korean conservatives aided by the Chinese Army. Known to historians as the Gapsin Coup, the uprising marked the first confrontation between China and Japan. In an effort to defuse rising tensions, both China and Japan agreed to inform the other first should the situation require military intervention in Korea. This agreement formed part of the Tianjin Convention, signed by both nations on 18 April 1885, which brought to an end the first phase of modern Sino-Japanese interaction in Korea.

This first clash between China and Japan took shape when Japan, having undergone ‘modernization’ for close to a decade under the guidance of Emperor Meiji (r. 1867–1912), tried to enforce this ‘modernity’ on Korea through Western-style treaties and trading terms. These advances were all rejected until Japan used strong-arm tactics to

A view of the Chinese armoured turret ship HICMS *Dingyuan*. This vessel was primarily of wooden construction incorporating external iron and hardened wood cladding to increase protection against penetration by cannon shells. Only a decade separated the building of *Dingyuan* and the Japanese protected cruiser HIJMS *Matsushima*, but the speed with which technology advanced in the late 19th century meant that by the time the two navies met at the battle of the Yalu River on 17 September 1894, the Chinese ironclads were wholly outclassed by Japan's newer protected cruisers in terms of speed and firepower. [NH 1926 courtesy of the Naval History & Heritage Command]





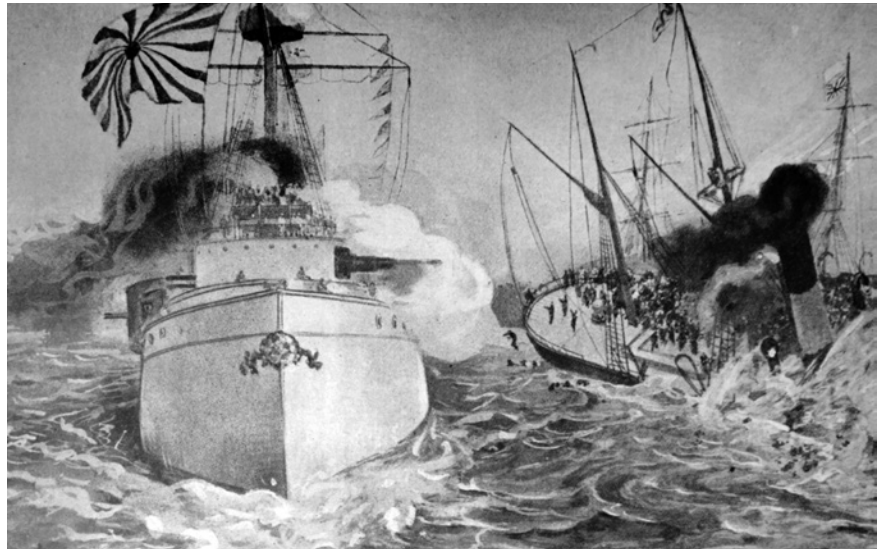
HIJMS *Matsushima*, photographed in French Mediterranean waters soon after completion. This photograph was received by the US Navy's Office of Naval Intelligence in Washington, DC, on 7 December 1892. The protected cruiser was so-called because it had an inner armoured shell that offered protection for vital spaces such as propulsion machinery and magazines, from fragments caused by exploding shells penetrating the outer shell of the ship. Protected cruisers were an alternative to armoured cruisers, which also had a belt of armour along part of the outer shell of the ship, usually along the waterline area and covering part of the freeboard area. It was acknowledged that armouring the entire vessel would increase the total weight of the ship and hence reduce its speed and agility. [NH 88893 courtesy of the Naval History & Heritage Command]

force the Koreans into an unequal treaty, the Treaty of Ganghwa, signed on 26 February 1876. Japan initiated an 'incident' by deploying her fledgling navy, the gunboat *Un'yo* to Korea, just as Commodore Matthew C. Perry's fleet of Black Ships (a Japanese term for Western vessels arriving at its ports) had used gunboat diplomacy to 'open up' Japan and its ports back in 1853–54, to facilitate American trade with Japan. The Treaty of Ganghwa was a formal challenge to the centuries-old China–Korea relationship. Korea's relationship with China was best described as *Sadae* (Serving the Great, submission to the stronger), while her relationship with Japan was between equal neighbours, known in Korean as *kyorin* (befriending the neighbouring country). Japan's desire to wrestle Korea out of China's embrace was in part caused by a rapidly expanding Tsarist Russia whose ambitions in the Far East were energized by the recently inaugurated Trans-Siberian Railway. Japan realized that Manchu China was no longer the geopolitical giant it once was and there was a real danger of losing Korea to Russia; if that happened, Japan's security would be in real danger.

Even so, before the succession of Emperor Meiji, Japan was still very much a feudalistic society, ruled by shōguns and largely modelled after the ancient Chinese system of government. For centuries, the Japanese had considered the Chinese civilization as the apex of Asian greatness, but when the British routed the Chinese in the First Opium War (1839–42), Japan lost confidence in the concept of Asian superiority. Ever since European armed merchantmen appeared off the Japanese coast in the first decade of the 19th century, Japan had been wary of foreigners. But when Commodore Perry came ashore in Japan on 14 July 1853, the Japanese realized that they could not maintain a closed society forever and had to submit to Perry's demand despite its harsh terms. However, Japan's decision to 'open up' was forced upon the country by the barrel of the gun and was widely resented. This process was seen as a matter of national survival, for if Japan could not effectively challenge this Western threat, it would perish as an independent nation. The Japanese solution was to embark upon 'Westernization' at breakneck speed, shedding thousands of years of Chinese Confucius traditions in just a decade. This wholesale transformation provoked criticism, but it was aided by the strength of the emperor and the united and highly centralized nature of Japan's government.

Having been beaten twice by the British and then humiliated by the French and Russians, the Chinese faced the same problem as the Japanese. The intellectuals of

A contemporary depiction of the sinking of the steamer SS *Kowshing* at the battle of Pungdo, the first naval battle of the First Sino-Japanese War, on 25 July 1894. [Universal History Archive/UiG via Getty Images]



both nations agreed on the urgent necessity for modernization, but for the Chinese, this process could not entail a loss of cultural identity. While the Japanese favoured the wholesale adoption of Western methods, the Chinese preferred a more selective approach, opting for only those elements they saw as being useful. The result was that this transformation was at best patchy; furthermore, Manchu China was at this stage weak. Throughout much of the second half of the 19th century, China was plagued by infighting and a series of very damaging rebellions, whereas Japan was largely united and relatively free from foreign interventions and destructive internal discord. Critically, at this vital moment, China lacked a strong leader like Emperor Meiji; instead, China was led by an uneducated and manipulative former court concubine, Cixi (1835–1908), who rose to become the Empress Dowager, effectively exercising total control over China for 47 years behind two successive ineffective boy emperors, Tongzhi (r. 1861–75) and Guangxu (r. 1875–1908).

The *casus belli* of the First Sino-Japanese War was an armed rebellion in Korea, the Donghak Peasant Revolution (January 1894–March 1895). Again, the Koreans requested Chinese intervention to put down the revolt; this time, however, the 1885 Tianjin Convention gave the Japanese an excuse to send troops as well. Although the Tianjin Convention specified that both armies had to vacate Korea once the rebellion was put down, the Japanese opted to stay, working with the pro-Japanese faction within the Korean government to resist the pro-Chinese faction. Sensing trouble, China sent reinforcements to support the pro-Chinese factions in Korea, but this force was ambushed at sea by the Japanese in an incident known as the battle of Pungdo (25 July 1894); during the clash, SS *Kowshing*, a British steamer hired to transport Chinese troops to Korea, was sunk. The loss of *Kowshing* prompted the Chinese to send replacement troops, now protected by the mighty Beiyang Fleet. However, loitering in the area was the Japanese Combined Fleet, sent to prevent the Chinese force from reaching Korea and thus force Korea into Japan's sphere of influence. A clash of two of the world's biggest navies was imminent, and the result was a decisive naval engagement, to be recorded in history as the battle of the Yalu River.

OPPOSITE

In this Japanese illustration, the Chinese cruiser *Yangwei* is shown being destroyed by an explosion during the battle of the Yalu River. In fact, *Yangwei* was accidentally rammed by HICMS *Jiyuan* while trying to escape from the battle; prior to being rammed, *Yangwei* had suffered severe damage.

[Photo12/UiG via Getty Images]

其十三
沈没清艦の破壊
櫓折れ舷碎け大艦
半ば惡浪に没して
宛然大骸骨星火一
點儼忽跡なり



CHRONOLOGY

1869

July

The Imperial Japanese Navy (IJN) is formally established.

1871

August

China's Northern Naval Squadron (NNS) is founded.

1875

20 September

In a bid to open up Korea to Japanese and foreign trade, Japanese forces land on Ganghwa Island, provoking the Korean garrison to

open fire in what becomes known as the Ganghwa Island incident.

1876

26 February

The Treaty of Ganghwa opens up Korea to Japanese trade and ends Korea's status as a Qing tributary state.

1881

March

The Chinese armoured turret ship HICMS *Dingyuan* is laid down at Stettin, Germany.

1884

4 December

The abortive Gapsin Coup begins in Korea, intensifying Chinese and Japanese involvement in that country.

1885

18 April

The Tianjin Convention commits China and Japan to withdraw their forces from Korea, which becomes a co-protectorate.

1886

13–15 August

During the Nagasaki Incident, Chinese sailors of the Beiyang Fleet clash with Nagasaki police, contributing to anti-Chinese feeling in Japan. The Japanese government initiates the building of a number of modern warships to counter the Chinese Navy.

1888

February

The Japanese protected cruiser HIJMS *Matsushima* is laid down at La Seyne-sur-Mer, France.

17 December

The Beiyang Fleet is established.



Li Hong-zhang, the viceroy of Zhili province, was a key figure in late-19th-century China. He masterminded not only the formation of the Beiyang Fleet, but also the Huai Army, one of the best-prepared armies in China. In addition, he was also in charge of the Beiyang Army, with the two together fielding roughly three-fifths of all China's troops. During the course of the war with France in 1884–85, Li did not comply with the appeals of the viceroys of the southern provinces for help, and they responded in kind during the war with Japan, meaning that only forces located in the north of China got involved in the conflict. [Author]



The First Sino-Japanese War was the first conflict in which modern propaganda played a key role on the Chinese home front. This Chinese article pronounces 'Great Chinese victory by General Ding in recovering Korea'. When the truth came out that in fact it was the Chinese who were routed, it was much harder for the Chinese public to accept, paving the way for a number of reforms and – when these measures failed – the Xinhai Revolution of 1911. (Hulton Archive/Getty Images)

1894

- 1 June** The Korean government sends a formal request for Chinese troops to suppress the Donghak Peasant Revolution.
- 22–23 June** Additional Japanese troops land in Korea, rapidly moving to occupy Seoul and Incheon.
- 25 July** During the naval battle of Pungdo, IJN forces sink the British transport ship *SS Kowshing*, prompting China to send supplementary troops to Korea escorted by the Beiyang Fleet.
- 29 July** A shock defeat of Chinese forces by a much smaller Japanese force in the battle of Seonghwan marks the collapse of Chinese morale in Korea.
- 31 July** China formally declares war, followed on 1 August by Japan.
- 15 September** Japanese land forces decisively defeat the Chinese at the battle of Pyongyang.

17 September The Japanese Combined Fleet fights China's Beiyang Fleet at the battle of the Yalu River.

24 October Japanese forces invade the Chinese mainland.

21 November Japanese land forces defeat the Chinese and capture Lüshunkou.

1895

- 9 February** *Dingyuan* is scuttled.
- 12 February** Japanese forces capture Weihaiwei.
- 23 March** Japanese forces capture the Penghu Islands and Taiwan.
- 17 April** Chinese and Japanese representatives sign the Treaty of Shimonoseki, ending the First Sino-Japanese War.

1908

- 30 April** While anchored in the Penghu Islands, *Matsushima* sinks following a magazine explosion.

DESIGN AND DEVELOPMENT

NAVAL TECHNOLOGY AND TACTICS 1860–94

The 1880s was a time of great change in nautical design as warships moved from sail to steam propulsion, from muzzle-loading to breech-loading guns, and from cannon balls to explosive shells. In the vanguard of these changes were Britain, France, Germany and Italy, experimenting with various arrangements of guns and armour. There were numerous debates as to what constituted the ideal layout. While some argued that a warship should have centreline turrets, others favoured a central casemate with large guns on turntables at each corner; similarly, some advocated placing the guns in barbettes (open-topped breastworks) while others wished to hide them behind armoured shields.

In the late 19th century, Britain's long-standing rival France simply did not have the financial resources or the political means to rival the Pax Britannica. Britain was at the apogee of imperial greatness, with the Royal Navy ruling the world's oceans, the guardian and protector of the mightiest empire in the modern era. In 1856, the French seaman Vice-Admiral Louis Édouard Bouët-Willaumez realized the future of naval warfare was in steam. He prophesied a new concept in naval warfare whereby dash and boldness brought about by a daring individual would win the day. This concept was to be developed further and emerge into what was to become known as the *Jeune École*



(‘Young School’). Instead of having to match the British head-to-head in terms of deadweight and gun size, France would deploy small, agile, powerfully equipped ‘cruisers’ armed with the latest wonder weapons as a means to even the odds. These fast, hard-hitting mini-battleships would be assisted by a fleet of smaller torpedo boats and employ classic hit-and-run tactics to defeat the enemy’s slow-moving battleships before they could react. The *Jeune École* concept was ideally suited to up-and-coming powers such as Japan, particularly as that country lacked the resources to conduct an arms race in the form of expensive battleships. The essence of this concept was to avoid large-scale pitched battles like Trafalgar (1805) or Hampton Roads (1862), instead hitting the enemy where he least expected it, severing vital trade and logistics routes through commerce raids, not unlike those conducted by privateers of the 16th century.

The success of the *Jeune École* concept was facilitated by several key technological developments. The first lay in the advances made in gunnery and explosives. In the early 1820s, French artilleryman General Henri-Joseph Paixhans invented the shell gun – the first naval gun capable of firing explosive shells at a flat trajectory. When fired at a ship, the shell gun’s explosive shell (for which Paixhans had developed a fuse that ignited automatically on discharge) would lodge itself in the target ship’s hull and then detonate, thereby giving smaller guns superior hitting power over traditional larger-calibre guns. Wooden-hulled ships were now significantly more vulnerable to gunfire; but the adoption of this technology was still limited by the shortcomings of the 68-pdr gun which fired this new ammunition (it was slow to load and its range was inferior to that of contemporary conventional guns) and by the nature of explosives in that era. Although the use of gun-cotton was considered to be a major

On 20 July 1866, the Austrian Navy won a decisive naval victory over the Italian Navy at Lissa. The Austrian ships employed a wedge-shaped ‘V’ formation and charged towards the Italians, whose ships were in a line-ahead formation. (This was the tactic that the two Chinese armoured turret ships were designed and configured to carry out, with maximum arc of fire over the bow.) In this 1911 work by Eduard Nezbeda, the Austrian triple-decker wooden battleship *Kaiser* rams the Italian ironclad warship *Re di Portogallo*. (Imagno/Getty Images)

improvement over black powder it was not until 1885, when French chemist Eugène Turpin patented the use of pressed and cast picric acid in blasting charges and artillery shells, that high-explosive shells started to become common. Picric acid bestowed a massive improvement in explosive power, so much so that in less than two years the French and soon the British adopted it as their main source of high explosive. (The French called the high explosive Melinite, but to the British it was known as Lyddite after the coastal town of Lydd where it was made.) Despite an export ban, a Japanese naval officer, Lieutenant-Commander Tomioka Sadayasu, was able to obtain by stealth samples of Melinite in 1888, and it was successfully reverse-engineered by the chemist Shimose Masachika. As a result, the Japanese version of Melinite was known as Shimose explosive; adopted by the Imperial Japanese Navy (IJN) in 1893, it proved to be a vital factor in the Japanese victories in 1894–95 and 1904–05.

A second technological advancement was the development of torpedoes. Invented in the 1860s, the torpedo was seen as a wonder weapon by many at that time; in reality, it was a notoriously unreliable weapon. The first successful use of free-running torpedoes in war occurred during the Russo-Turkish War (1877–78), when Russian torpedo boats operating from the torpedo-boat tender *Velikiy Knyaz Konstantin* sank the Turkish steamer *Intibah* with self-propelled torpedoes on 16 January 1878. The French, who embraced the torpedo as a cheap means to counter a more powerful rival, did use some of these weapons during the Sino-French War (1884–85), notably at the battle of Fuzhou (23 August 1884), but these were spar torpedoes (bombs attached to long sticks) and not free-running self-propelled torpedoes. In another early use of the torpedo, during the Chilean Civil War (1891) the torpedo gunboat *Almirante Lynch* sank the armoured frigate *Blanco Encalada* with a torpedo on 23 April 1891. The Chilean frigate was the first warship to be sunk by a free-running torpedo, but its demise owed more to luck than astute tactics and the engagement took place at very close range. The torpedo would not become a really formidable weapon until World War I.

The third technological advance was the development of quick-firing (QF) guns during the 1880s. The rate of fire – up to 12 rounds per minute – became increasingly important with the development of fast raiders armed with the deadly torpedoes. The first QF guns were multi-barrelled, small-calibre guns such as the Nordenfelt hand-cranked ‘machine gun’, which fired a 25mm brass jacket-encased solid-steel bullet. By the mid-1880s, however, a new generation of Hotchkiss ‘QF’ guns of 47mm (3-pounder) and 57mm (6-pounder) calibre came to the fore. Capable of firing exploding ‘common pointed’ (CP) shells weighing 3–6lb (1.36–2.72kg), QF guns were a key feature of the pre-dreadnought battleships of the 1890s. The battle of the Yalu River would see the first large-scale use of QF medium-sized guns in combat. While QF guns were unable to penetrate the thick armour on the ironclads, they were an excellent weapon to destroy the superstructure of an opposing battleship, start fires and kill enemy gun crews. Their development was also useful in defending against ramming tactics, as when *Zhenyuan* tried to ram a Japanese warship – the Chinese claimed that it was HIJMS *Yoshino*, while the Japanese maintained that it was HIJMS *Naniwa* – only for *Zhenyuan* to capsize before it could reach its opponent due to the sheer volume of fire the Chinese vessel received from the Japanese protected cruiser’s QF guns.



Fielded in the 1880s and 1890s, the 25mm four-barrel Nordenfelt gun was a rapid-firing light gun to be used to defend larger warships against small, fast-moving torpedo boats. This example is found inside the Tower of London, outside the regimental museum of the Royal Regiment of Fusiliers. [Author]

The invention of QF guns was made possible by advancements in explosives. Instead of using ammunition consisting of separate shell and bag charge, these weapons employed a combined shell and cartridge, requiring a much-reduced loading time. Because the use of old-style gunpowder produced an inordinate amount of black smoke, which obscured the target after only a few shots, there was a pressing need for smokeless propellant; and because the Hotchkiss QF gun was first manufactured in France, it was that country which took the lead in developing a smokeless propellant.

The main difficulties with breech mechanisms were resolved in the two decades after the American Civil War (1861–65). Improved metallurgy, along with the advent of viable breech-loading designs, made possible significant advances in terms of longer ranges and higher rates of fire. Before Melinite and Lyddite became widely available, however, the use of ‘brown’ or ‘cocoa’ powder – 79 per cent saltpetre, 18 per cent charcoal (made from carbonized straw), and 3 per cent sulphur – employing incompletely charred wood was the norm. Brown powder gave sustained burning that was effective ballistically, but did not create excessive pressures within the gun barrel. To improve range, gun-barrels were lengthened, some to as much as 30–35 times the diameter of the bore; this was the reason why HIJMS *Matsushima*’s 320mm Canet main gun was as long as 38 calibre.

Naval architects had always striven to achieve a balance between protection and speed. While adding armour was good for protection, its weight would slow down the ship. Furthermore, any increase in armour meant an increase in deadweight, which increased operating costs. This engendered a compromise in favour of speed and firepower towards what was to be known as the ‘protected cruiser’ design. Instead of the entire length of the protected cruiser being covered with armour, the armour covered only the vital parts of the ship, such as the machine spaces, to protect against fragments caused by shells exploding above the ship. The early protected cruisers had side armour only; the breakthrough came with the Chilean protected cruiser *Esmeralda*, laid down in April 1881 and completed in July 1884 by the British firm Armstrong, at its Elswick shipyard. *Esmeralda*’s protection scheme included a full-length protected deck up to 50mm thick and a cork-filled cofferdam along its sides, and the ship set the standard for cruiser construction for years to come. The French Navy adopted the

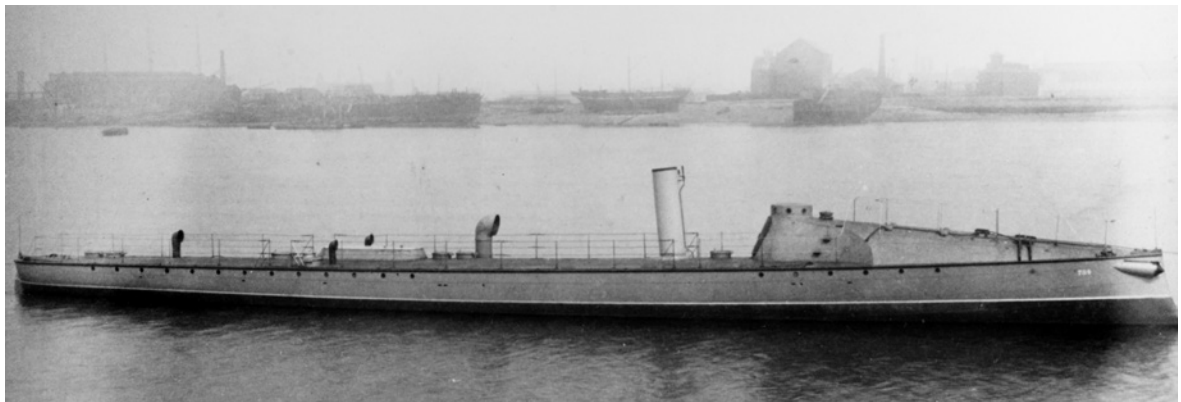
protected cruiser design wholeheartedly in the 1880s, a decision which in turn inspired the IJN to accept the *Matsushima* design.

In normal circumstances in the development of naval warfare, new designs give rise to new tactics, but there are occasions when tactics influence design. The use of ramming as a naval tactic can be traced back to the days of triremes in the ancient Mediterranean, but it was given a new lease of life during the battle of Lissa (20 July 1866), part of the Third War of Italian Independence (1866), when the weaker Austrian Navy defeated the much stronger Italian Navy through the use of ramming. The re-adoption of ancient naval tactics in a 19th-century context prompted the application of new technology and metallurgy to ships of the 1870s and 1880s. This affected ship design of this era to such an extent that both *Dingyuan* and *Matsushima* were fitted with a ramming horn on the bow.

The battle of Lissa also witnessed the Austrians' reversal of a centuries-old naval tactic through the clever use of a new tactical formation, the wedge-shaped 'V', to defeat the traditional crossing of the 'T'. The Austrians opened the battle by adopting a 'V' formation to cut into the Italian fleet, which was arrayed in a line-ahead formation, thereby successfully breaking the Italian fleet into pockets before annihilating them one by one. The successful use of this tactic by the Austrians left such an imprint on the Chinese that at the Yalu River they adopted the same 'V' formation while the Japanese held the line-ahead formation as used by the Italians 28 years earlier. To reinforce further this 'headlong charge' tactic of ramming, both *Dingyuan* and *Zhenyuan* were designed so that their main armament – two main turrets located on both sides of the ship, albeit offset from each other, as well as a smaller turret mounted at the bow of the ship – could all be fired while the ship was steaming towards the enemy.

During the 1880s there were steady improvements in naval propulsion, prompted by advances in metallurgy that made higher steam pressures possible and reduced weight. In the 1870s it was common for a third cylinder to be added onto the two-stage compound steam engine to make the triple-expansion engine. (A fourth cylinder was added in the 1890s, but this development occurred too late to appear in the warships that fought at the Yalu River.) These improvements on the traditional reciprocating steam engine led to a marked increase in speed that was surpassed only by the radical innovation of the steam turbine, as first demonstrated by the British experimental steamship *SS Turbinia* in 1894.

This photograph shows the Beiyang Fleet's torpedo boat HICMS *Zuoyi* before being fitted out. Launched in 1887 by the Scottish firm Yarrow, *Zuoyi* had a displacement of 90 tons; the boat was 39.01m long and 3.81m wide with a draught of 1.91m and a top speed of 23.8kn. In addition to three 14in (356mm) torpedo launchers – two forward and one aft – *Zuoyi* carried three 47mm Hotchkiss QF guns and four 37mm five-barrel Hotchkiss rotary guns. This boat was one of the very first Chinese vessels to carry the 'Blackhead' (Schwartzkopff) torpedo. (NH 70426 courtesy of the Naval History & Heritage Command)



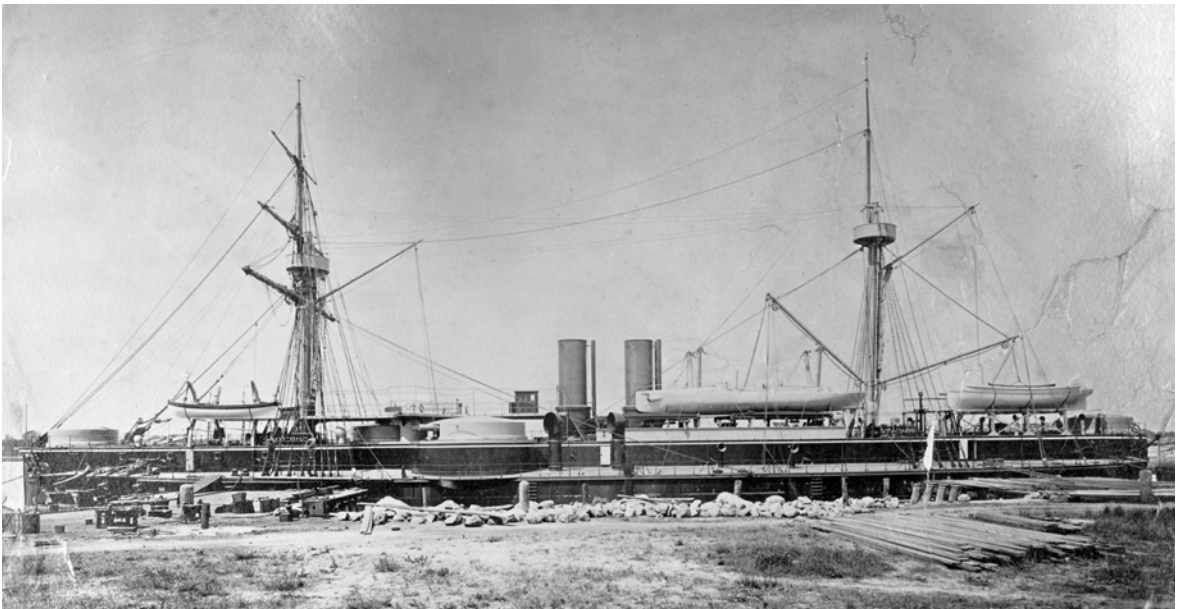
THE CHINESE NAVY

In 1862, Horatio Nelson Lay, the Inspector-General of the Imperial Maritime Customs Service (IMCS), tried unsuccessfully to raise a Chinese fleet based on a mix of newly built and second-hand (ex-Royal Navy) wooden screw and paddle dispatch gunboats: HICMS *China* (flagship), HICMS *Peking*, HICMS *Amoy*, HICMS *Kiang Soo*, HICMS *Kwangtung* and HICMS *Tientsin*, plus the tender *Thule* and the supply ship *Ballarat*. Known as the Lay-Osborn Flotilla, this fleet arrived at Shanghai in September 1863, but was disbanded soon thereafter over a dispute concerning the chain of command and ever-escalating cost. The Chinese expected their men to run the flotilla, while Captain Sherard Osborn RN, who had sailed the ships from Britain to China, assumed that it was to be under his command and manned by hired British crewmen. The culprit behind this confusion was none other than Lay, who was sacked and kicked out of China. This sorry adventure cost the Chinese 382,000 Taels of silver with nothing to show for it.

During the Taiping Rebellion (1850–64), the Chinese tried again to found a navy, but a second misfortune landed on them when they wrongly placed their trust in one Henry Gamaliel Ward, a US businessman who was appointed as sole agent to source three gunboats from the United States on behalf of the Chinese government. Ward was paid 400,000 Taels of silver for this, but he double-crossed the Chinese and sold the gunboats – *Dai Ching*, *Chi Kiang* and *Kiang Soo* (not to be confused with the earlier British vessel) – to the Union Navy for US\$177,000.

On 2 May 1874, a Japanese force of 3,600 soldiers landed on Taiwan, supposedly to avenge the massacre of 54 shipwrecked Ryukyuan sailors – inhabitants of the independent kingdom known as Ryukyu, subsequently annexed by Japan in 1879 – after they were decapitated by Paiwan aborigines in December 1871. Japan's Taiwan

This is HICMS *Dingyuan* just before the armoured turret ship headed from the Stettiner Maschinenbau AG Vulcan shipyard to China (naval stores can be seen lying on the wharf). Note the two torpedo boats (*Ding-one* and *Ding-two*) just aft of the stack, both of which were taken away from *Dingyuan* and assigned to the Beiyang Fleet's torpedo squadron. (NH 2088 courtesy of the Naval History & Heritage Command)



HICMS *DINGYUAN*

Design: Enlarged Sachsen-class armoured frigate incorporating elements of designs from the ironclad HMS *Inflexible*.

Others in class: HICMS *Zhenyuan*

Construction: Double bottom with double longitudinal iron frames, transverse bulkheads and iron-plating-covered teak backing. Three decks, 16 watertight compartments and a double bottom that ran for 60 per cent of the length of the hull.

Shipyard: Stettiner Maschinenbau AG Vulcan

Naval architect: Rudolph Haack

Laid down: 31 March 1881; hull number: No. 1 Tiejia (iron armour)

Launched: 28 December 1881

Completed: 1884

Delivery: Arrived in China 29 October 1885

Displacement (fully laden): 7,670 tons

Dimensions: 94.5m LoA, 18.3m beam, 6.1m draft

Machinery: Two horizontal three-cylinder compound steam engines, eight cylindrical boilers, twin shafts, 6,200hp

Speed: 14.5kn

Coal capacity: 700–1,000 tons (two coal bunkers below deck, one above)

Range: 8,335km at 10kn

Crew: 329 plus marines and a band staffed by teenagers

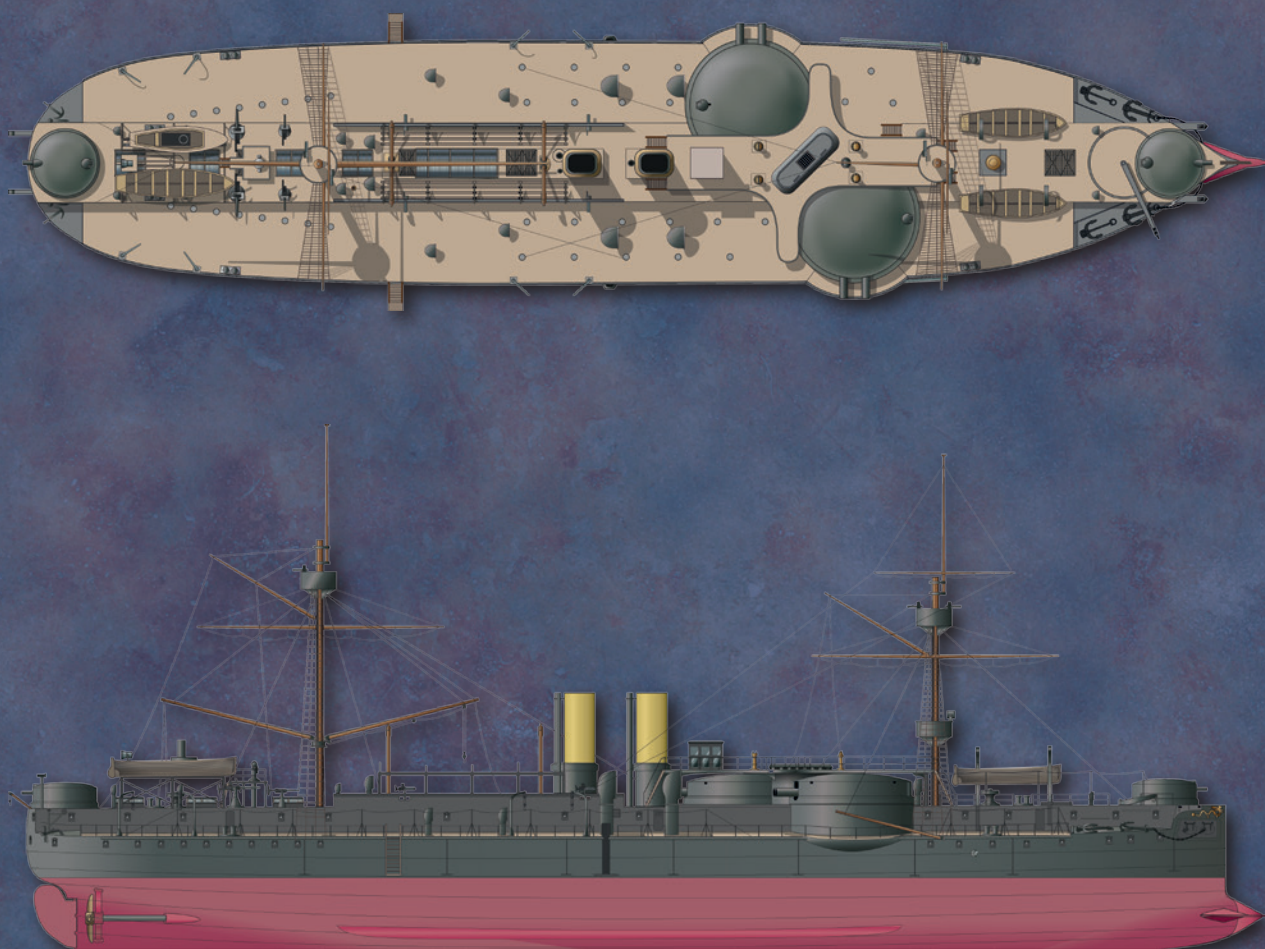
Armour: 43m-long central casemate covering the magazines, boiler room and engine-room space. Waterline belt: 356mm; deck: 76mm; barbettes: 305mm; conning

tower: 203mm; casemate: 305–355mm, covering 43.5m of the side; turret: 25mm. The ship's armour was made of wrought iron and backed with teak, with four alternating layers (iron/teak/iron/teak).

Armament: Main: four 305mm Krupp RKL/25 C/80-calibre main guns in twin turrets. Secondary: two 150mm Krupp Model 1880 RBL chase guns, one forward and one aft; four 75mm Krupp 'short' landing guns (dual use: for landing or on board ship on naval mount); two 57mm Hotchkiss QF guns; two 47mm Hotchkiss QF guns; eight 37mm five-barrel Hotchkiss rotary guns; three 355mm torpedo tubes (two facing forward, one on each side, and one facing aft) with a total of 21 torpedoes; naval ram.

Notes: Sea trials began on 2 May 1883, but an explosion caused by faulty gunnery forced the ship back into dock for repairs. Delivery of *Dingyuan* and *Zhenyuan* was delayed after the French threatened to interdict and sink these two new ironclads as they sailed for China. Along with *Dingyuan* came two torpedo boats known as *Ding-one* and *Ding-two* (*Zhenyuan* had *Zhen-one* and *Zhen-two*), each weighing 15.7 tons and carrying one torpedo. These boats were supposed to be carried on the deck and released just before the battle, but on arrival in China, they were separated from their mother-ship and placed into a separate torpedo squadron, not part of the Beiyang Fleet based at Lüshunkou, and did not see action at the Yalu River.

Expedition impelled the Chinese imperial court to release money to purchase modern warships from Europe. After the Lay-Osborn Flotilla fiasco and the double-cross by Henry Gamaliel Ward, the Chinese court placed its trust in Sir Robert Hart, an Ulsterman who headed the IMCS, to secure the necessary warships. Being British, Sir Robert naturally favoured Britain as the first option for any China naval acquisition, and so he sent a telegram to the IMCS representative in London, James D. Campbell, asking him to gather information about potential candidates for the Chinese fleet and specifying that any such vessels had to be able to mount a main gun that could penetrate 80in of iron plate at a range of 500yd. Through Campbell, contact was made with the prominent industrialist and scientist Sir William G. Armstrong. In 1875, Campbell secured four 'coastal monitors' – small, shallow-draught unprotected gunboats, each displacing 400–500 tons and armed with a heavy cannon. These four



vessels, known to the Chinese as ‘mosquito boats’, were to be the first modern Chinese warships.

Following the Franco-Prussian War (1870–71), however, the British in China faced increasing commercial competition from Germany, as that country’s growing military prowess received increased attention. Egged on by Gustav von Detring, the chief IMCS representative in Tianjin, and Constantin von Hanneken, a German military advisor, Li Hong-zhang, the viceroy of Zhili province (now Hebei province) and Beiyang Minister, agreed to receive delegations from key German arms suppliers such as Krupp, Mauser and Vulcan. To sweeten the deal, the Germans promised the Chinese naval vessels with a top speed of 14kn, but – critically – 20,000 Taels of silver cheaper than the ships offered by Armstrong. In fact, the German offer was less than half the price of the latest top-of-the-line British ironclad, HMS *Inflexible*.

	HMS <i>Inflexible</i>	SMS <i>Sachsen</i>	HICMS <i>Dingyuan</i>
Launched	1876	1877	1881
Displacement	10,880 tons	7,514 tons	7,670 tons
Dimensions (LoA, beam, draught)	105m, 23m, 8m	98.2m, 18.4m, 6.32m	94.5m, 18.3m, 6.1m
Horsepower	6,500hp	4,917hp	6,200hp
Speed	14.73kn	13.6kn	14.5kn
Cost	£812,000	Approx. £423,178 (10.3 million gold Marks, 1,612,500 Tael of silver)	Approx. £370,000 (9 million gold Marks, 1,409,000 Tael of silver)

The British further damaged their chances of winning orders by cold-shouldering the Chinese fact-finding mission, while the Germans worked hard to win the Chinese over. As a result, the fact-finding mission's report was decidedly pro-German. Li opted for the German offer, and the first order went to the Stettin yard for 6.2 million gold Marks (not including weaponry): *Dingyuan* was the result.

In the early 1890s, the Chinese Navy was twice the size of the IJN and organized into four fleets: the Beiyang (or North Seas) Fleet, with a remit to defend the section of coastline closest to the capital, Beijing; the Fujian Fleet, overseeing south-eastern China and the Taiwan Straits; the Guangdong Fleet, in the South China Seas; and the Nanyang (or South Seas) Fleet, based in Shanghai and tasked with defending the East China Seas. Of the four fleets, the Beiyang Fleet was prioritized and therefore when money was available, it was assigned the two German-built ironclads *Dingyuan* and *Zhenyuan*. In terms of firepower and armour, both of these ships were superior to anything the IJN had in service, and were seen by the Chinese as a key deterrent to the increasingly belligerent Japanese. Like the Japanese, in addition to placing orders for ships abroad, the Chinese were also heavily engaged in establishing a homegrown shipbuilding and weapons-manufacturing capability. In 1865, Jiangnan Machinery was established in Shanghai, followed in 1866 by China's first modern shipyard, established (with help from the French) in Mawei, just outside Fuzhou in Fujian province.

THE IMPERIAL JAPANESE NAVY

Even before the dawn of the Meiji era, foreign advisors had influenced the Japanese transition from the medieval to the modern era. First to make an impact were the Dutch, but they were soon replaced by the French, whose work in the Shimonoseki Campaign (1863–64) and the subsequent Boshin War (1868–69) impressed the Japanese so much that they were tasked with building the Imperial Japanese Navy. In 1865, the French naval engineer François Léonce Vernet was invited to come to Japan to establish a naval yard, later to be known as the Yokosuka Naval Arsenal.



While the French dominated the naval construction side, the British guided the Japanese on matters of seamanship and navigation. To alleviate financial pressure on the state, the Meiji regime began to promote private enterprises to build ships for the IJN. State assets were sold off at rock-bottom prices, creating the foundation of what would become key heavy-industrial conglomerates such as Mitsubishi and Kawasaki. Not to be left out, the British dispatched Captain Edward Horsey of the Royal Marine Artillery to teach gunnery, followed by an expanded advisory team led by Lieutenant-Commander Archibald Douglas RN. Of the 34 members of this naval advisory team, Commander Leonard Lawrence Peel Willan RN and Captain John Ingles RN left the greatest impression on the Japanese, especially in subjects such as gunnery, navigation and tactics. A total of 31 IJN cadets taught by Willan would later play key roles at the Yalu River. Ingles taught tactics, and it was he who gave the Japanese the idea of the line-ahead formation, a tactical move that contributed much to the Japanese victory at the Yalu River. The British did not have it all their own way, however; Henry Walton Grinnell, a naval veteran of the American Civil War, served as the inspector-general in the IJN with the rank of rear-admiral.

As late as the 1880s, the IJN remained a coastal-defence force equipped largely with second-hand European warships supplemented with the odd locally built coastal-defence vessel, such as *Aoyagi* (879 tons), *Amagi* (911 tons) and *Iwaki* (650 tons). Furthermore, in the years after 1868, Japan did not have the technical abilities nor the supporting industries such as engine- and armament-makers to support large-scale naval construction. Ships not only had to be made in Europe, but – even as late as 1879 – they had to be sailed to Japan by a foreign crew. As the country prospered, however, Japanese confidence grew as more and more overseas-educated cadets returned and the number of foreign advisors fell.

For 20 years, the Chinese and the Japanese were locked in an arms race to build and buy as much weaponry as possible. The rivalry was so intense that Japan was willing to do anything to win this arms race. In November 1894, less than a year before the battle of the Yalu River, the Japanese outwitted the Chinese and successfully concluded a deal with the Chilean Navy to purchase *Esmeralda*, an Armstrong-built protected cruiser; the IJN promptly renamed the ship HIJMS *Izumi* (shown here) and commissioned it into service on 8 January 1895. [NH 58809 courtesy of the Naval History & Heritage Command]

HIJMS MATSUSHIMA

Design: Matsushima-class protected cruiser, named after the three most famous scenic spots in Japan, aka *Sankeikan* ('three scenic views ships').

Others in class: HIJMS *Itsukushima* and HIJMS *Hashidate*; unlike *Matsushima*, these two ships had the 320mm main gun pointing forwards.

Construction: Steel hulls with 94 frames and a double bottom covering only from frames 16–78, with the area between the bulkheads and armour filled with copra (dried coconut kernels).

Shipyard: Société Nouvelle des Forges et Chantiers de la Méditerranée naval shipyards at La Seyne-sur-Mer, France

Naval architect: Louis-Émile Bertin

Laid down: 17 February 1888

Launched: 22 January 1890

Completed: 3 September 1891

Delivery: Arrived in Japan 19 October 1892

Displacement (fully laden): 4,556 tons

Dimensions: 91.8m LoA, 15.6m beam, 6.0m draft

Machinery: Two triple-expansion steam engines, six boilers, twin shafts, 5,400hp

Speed: 16kn

Coal capacity: 670–680 tons

Range: 10,185km at 10kn

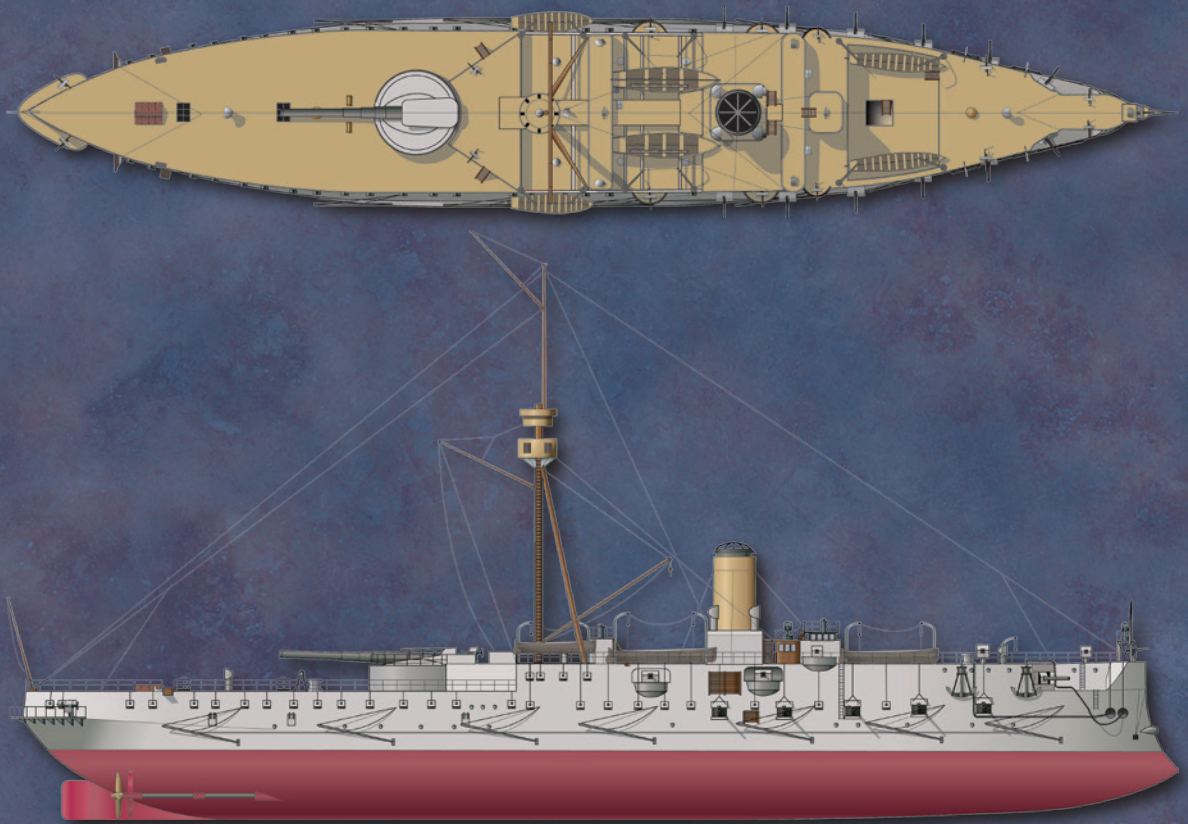
Crew: 360

Armour: Top deck: 38–40mm; main deck: 51mm; shell hoist of main gun: 250mm; sloping surface hull: 75mm; barbettes: 300mm; turret: 100mm, 120mm gun shield: 110mm; machinery glacis: 50–51mm. The ship's armour was made of Harvey Steel.

Armament: Main: one 320mm/38 Model 1887 Canet gun. Secondary: 12 120mm/40 Armstrong QF Mk I–IV guns (11 on *Itsukushima* and *Hashidate*); six 47mm Hotchkiss QF guns (five on *Itsukushima*); two 37mm five-barrel Hotchkiss rotary guns (11 on *Itsukushima* and 12 on *Hashidate*); four 356mm torpedo tubes with a total of 20 Type 88 'Blackhead' torpedoes; naval ram.

Very early on, it was clear to the Japanese that a strong navy was a key element of national regeneration. The Meiji regime exhibited determination and leadership as it built its navy, in February 1872 creating a ministry dedicated to naval affairs and staffed entirely by Western-trained professional technocrats. By contrast, the Chinese lacked such a unified military force: Viceroy Li Hong-zhang's jurisdiction was limited to northern China only, and command of the Beiyang Fleet was in the hands of Admiral Ding Ru-chang, whose military experience had been gained from his service in the cavalry. In contrast the Japanese placed knowledge at the forefront. In 1871, even before the establishment of the Ministry of the Navy, the Japanese sent 16 trainees abroad (14 to Britain, two to the United States) for training in naval sciences; among them was Tōgō Heihachirō, later to serve as the captain of *Naniwa* during the First Sino-Japanese War.

Japan bought three state-of-the-art warships from Britain – the central-battery ironclad *Fusō* and the ironclad corvettes *Kongo* and *Hiei*, all ordered in 1875 and completed in 1878 – which were to play a significant role in the First Sino-Japanese War. The 1882 Navy Expansion Bill required the construction of 48 warships, among which were three Matsushima-class protected cruisers (four were planned but only three were built) – *Itsukushima* (completed in 1891) and *Matsushima* (completed in 1892), both built in France, and *Hashidate*, built in Japan and completed in 1894. These three were based on the principles of the concept of *Jeune École*, as promoted



by French naval architect Louis-Émile Bertin. To meet this enormous expenditure, the Japanese government not only issued naval bonds, but also deducted 10 per cent from all civil servants' salary as a contribution towards a 'naval fund'; moreover, Emperor Meiji was said to have donated 10 per cent of the royal household's annual budget towards naval development during 1893–98, and the Empress Dowager sold much of her jewellery to aid the nation's bid to build a modern navy. Caught up in this furore, all Japanese parliamentarians voted in unison to contribute 25 per cent of their salary towards naval development. By 1894, it was estimated that the IJN took almost 49 per cent of the defence budget.

With such determination and national dedication, the IJN soon surpassed the Chinese Navy in naval power. From 1888 onwards, the Chinese did not make any naval acquisitions; coupled with the fact that naval budgets were always underfunded, this meant that the Beiyang Fleet was nothing more than a toothless tiger. By September 1894, China's sailors were not only out of practice on their gun-drills, but lacked key ammunition on the day of battle, meaning that the Chinese had lost the firefight even before the battle of the Yalu River began. By that date, the IJN had 37 major vessels and 26 torpedo boats with a total deadweight of 94,703 tons. By comparison, the Beiyang Fleet had 17 ships with a total deadweight of 35,468 tons. The Japanese were catching up not only in terms of quantity, but had exceeded the Chinese in terms of substance. The IJN had nine ships developing 5,000hp or more



Matsushima pictured at the Tategami dry dock, Nagasaki, Japan, during the 1890s. In the mid-1880s the Japanese government began to privatize much of the country's military-industrial complex and in 1884 these docks became part of the Mitsubishi Company. [NH 58806 courtesy of the Naval History & Heritage Command]

(*Akitsushima*, *Chiyoda*, *Hashidate*, *Itsukushima*, *Matsushima*, *Naniwa*, *Takachiho* and *Yoshino*, plus *Yaeyama*, not present at the Yalu River), while the Chinese had only six of comparable output (*Dingyuan*, *Jingyuan*, *Jingyuan (CY)*, *Laiyuan*, *Zhenyuan* and *Zhiyuan*).

In addition to naval ships, the Japanese government supported the development of a merchant marine force that could serve as the logistical arm of both the Imperial Japanese Army (IJA) and the IJN. In total, 143 civilian vessels (37.8 per cent of Japanese-flagged merchant ships) were commandeered, 112 for the IJA and 24 for the IJN, as well as seven sailing vessels tasked with transporting captured weapons and *matériel* back to Japan. One vital part of the Japanese merchant marine fleet was the creation in 1885 of the Nippon Yūsen Kabushiki Kaisha (Japan Mail Shipping Line: NYK Line), much of it with government support. During the first stage of the war, 18 merchant ships were taken up from trade, of which 12 were from the NYK Line.

In the 1880s, the IJN was organized into five naval districts, each with a local headquarters. Eleven key state-of-the-art warships – *Akitsushima*, *Chiyoda*, *Fusō*, *Hashidate*, *Itsukushima*, *Matsushima*, *Naniwa*, *Takachiho*, *Takao*, *Yaeyama* and *Yoshino* – were not part of any naval district, however, but were centrally managed and grouped into the Standing Fleet (aka the Readiness Fleet). The rest, collectively known as the Western Fleet and consisting of obsolete ships deemed unsuitable for front-line combat operations, were retained for coastal defence.

THE STRATEGIC SITUATION

Tension between Japan and China had been mounting steadily since the early 1870s, but it was not until May 1874, when Japan mounted an expedition to Taiwan on the pretext of ‘revenge’ for the massacre of 54 shipwrecked Ryukyuan sailors, that the Chinese sensed that Japan was a threat. This triggered an arms race between Japan and China, especially at sea, with both sides seeking to obtain bigger and better ships. The Meiji regime’s strategic aim was to free Japan from Chinese dominance in East Asia; it was believed that the best way to do this was to wrestle Korea from China’s grasp and turn Korea into a vassal of Japan. This meant that from the outset, the Japanese trained and modelled their military forces with an aggressive, ‘expeditionary’ frame of mind; in other words, the Japanese soldier would always be seen to ‘attack’ and move forward. On the other side, the strategic philosophy of the Chinese had always been to ‘protect and defend’, a mindset epitomized by the construction of the Great Wall of China. When the Chinese purchased their first Western-built naval vessels from Britain in 1876, they bought a series of mini-gunboats (‘mosquito boats’) which were nothing more than mobile littoral forts; suitable for near-shore operation in calm waters, these vessels were completely unsuitable for foreign expeditionary ventures.

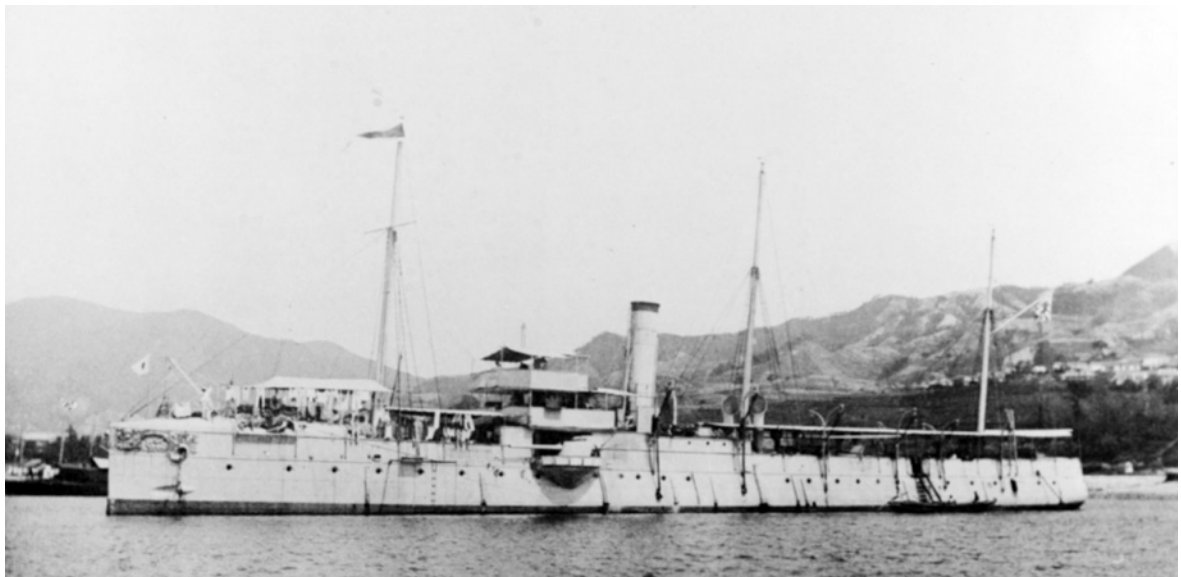
The Japanese drive to develop a modern navy can be described as a model of efficiency, but the Chinese effort was hampered by infighting and corruption. During the two decades after 1875, the budget allocated to the Northern Naval Squadron (NNS) and the Beiyang Fleet was never paid in full. In the early days, a shortfall of 30 per cent was common, but this deficit grew to as much as 63 per cent by 1894. Not only was underfunding a problem, but much of the Beiyang Fleet development tax

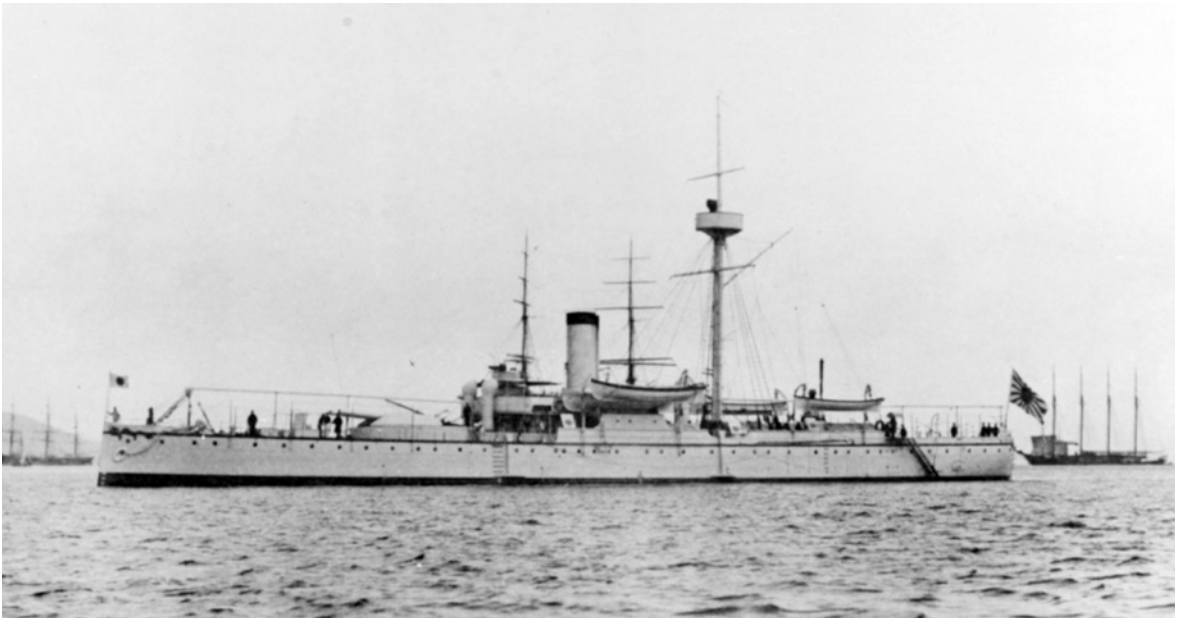
was also undercollected: again a shortfall of 30 per cent was common. Furthermore, 23 million Taels of silver were co-opted to various state funds. Regional viceroys and ministers were pressured to give money to the Empress Dowager for the 'reconstruction' of her many palaces and to fund the many lavish royal events, culminating with her birthday celebration in 1894. The civil servants begged, borrowed or stole from other budgets, forcing an increasing tax burden upon the population and borrowing from banks to make up the shortfall. During the decade before 1894, the naval budget was underpaid by 22 million Taels of silver. If we were to add this figure to the previous 23 million, making a total of 45 million Taels of silver, and if this combined sum had in fact been spent on the Chinese Navy, China could have obtained another 20 *Dingyuan*-type ironclads.

Besides having to deal with the usual bureaucratic red-tape, Li Hong-zhang had to find the money to fund the Beiyang Fleet and Army. In late 1889, perhaps because of his heavy workload or his advanced years or both, Li suffered a minor stroke which affected his speech and facial muscles; in 1891 he had another stroke, and although he partly recovered, he was never the same. By the time war came in 1894, Li was 71 years of age and partly paralysed.

Another factor often missed in Western monographs on the Beiyang Fleet was the decentralized nature of the Manchu regime during this period. The government was highly factionalized along regional and ethnic lines, and loyalty to the individual was much stronger than allegiance to any institutions; there was no sense of national cohesion. This state of affairs was best demonstrated by an episode in early 1895 when, following the destruction of the Beiyang Fleet, some of the captured Chinese naval vessels were pressed into IJN service; this prompted an official of the Nanyang Fleet to write to Vice-Admiral Itō Sukeyuki to request the release of HICMS *Guangbing*, a gunboat of the Nanyang Fleet, which had no quarrel with the Japanese – the battle of the Yalu River was, after all, a matter between the Beiyang Fleet and Japan. On hearing this request, Niu Chang-bing, a staff officer of the Beiyang Fleet,

A view of the captured HICMS *Guangbing* in IJN service. The Japanese retained the name and conducted a massive overhaul of the gunboat, changing the boiler; despite this, *Guangbing*'s top speed was slower than before. The gunboat's service life with the IJN was very short, with poor seamanship leading to the vessel running aground off Taiwan during a storm in December 1895. [NH 74411 courtesy of the Naval History & Heritage Command]





made a counter-proposal to Itō, asking him not to return *Guangbing* to the Nanyang Fleet; if Itō was to give anything back, he should give it to the Beiyang Fleet and not the Nanyang Fleet, for the latter force had not suffered any losses in the recent battle.

In a comparison of the external attributes of the Chinese and Japanese fleets, the Chinese Fleet certainly looked impressive: it was the biggest and the best naval force in Asia after the arrival of the two armoured turret ships *Dingyuan* and *Zhenyuan* from Germany, which gave the Chinese Navy the biggest guns, the thickest armour and the greatest tonnage. If the Nanyang Fleet, the Fujian Fleet and the Guangdong Fleet were to be included in the equation, the Chinese Navy was, without doubt, the strongest in Asia. If the Nanyang Fleet could have mobilized its 25 vessels to join the battle of the Yalu River, the balance would then have been 39 against 13 – quite impossible odds for Vice-Admiral Itō to overcome.

Viceroy Li knew that the Beiyang Army and the Beiyang Fleet were weaker than they seemed, however. His strategy was to avoid a fight if he could manage it; instead, he sought to initiate third-party intervention, preferably by the British if not the Russians, to pressure the Japanese into toning down their rhetoric. Throughout the crisis, Sir Nicholas Roderick O'Connor, the British ambassador to China, tried to mediate, warning the Chinese that in his view, the Japanese were determined to go to war right from the outset. Count Arturo Pavlovich Cassini, the Russian ambassador to China, gave Li a misleading signal, stating that Russia would 'not sit idly by to see Japan take Korea'. Li was trying to buy time, not only to enable diplomatic efforts to run their course, but also to give the Chinese military the time required to prepare for war.

While the Chinese were prevaricating, the Japanese had long ago decided to 'invade' Korea and use force to settle the impasse with the Chinese. All the signs were there: Japan's armed forces were mobilized, and the reserves had been called up. When Li was left with no option but to intervene in Korea and mobilized his troops

Following its capture by the Japanese on 12 February 1895 at the battle of Weihaiwei, the Chinese protected cruiser HICMS *Jiyuan* would be renamed *Saien* and enter IJN service. *Saien* participated in the Japanese invasion of Taiwan in May 1895 and was refitted in 1898. On 30 November 1904, the ship sank after striking a Russian mine at the battle of Port Arthur during the Russo-Japanese War. (NH 74403 courtesy of the Naval History & Heritage Command)

accordingly, he was still harbouring a plan to avoid a shooting war by cunningly chartering three British vessels (*Irene*, *Feishing* and *Kowshing*) as troop carriers, though only *Kowshing* would proceed towards Korea. He hoped that the Red Ensign would be enough to deter the Japanese from making any rash moves. Furthermore, Li argued that war had not been declared and that Japan would not be so stupid as to attack without a formal declaration of war. Therefore the order to the two Chinese ships accompanying *Kowshing* to Korea, the protected cruiser HICMS *Jiyuan* and the gunboat HICMS *Guangbing*, were clear: they were to return fire only if the Japanese fired first.

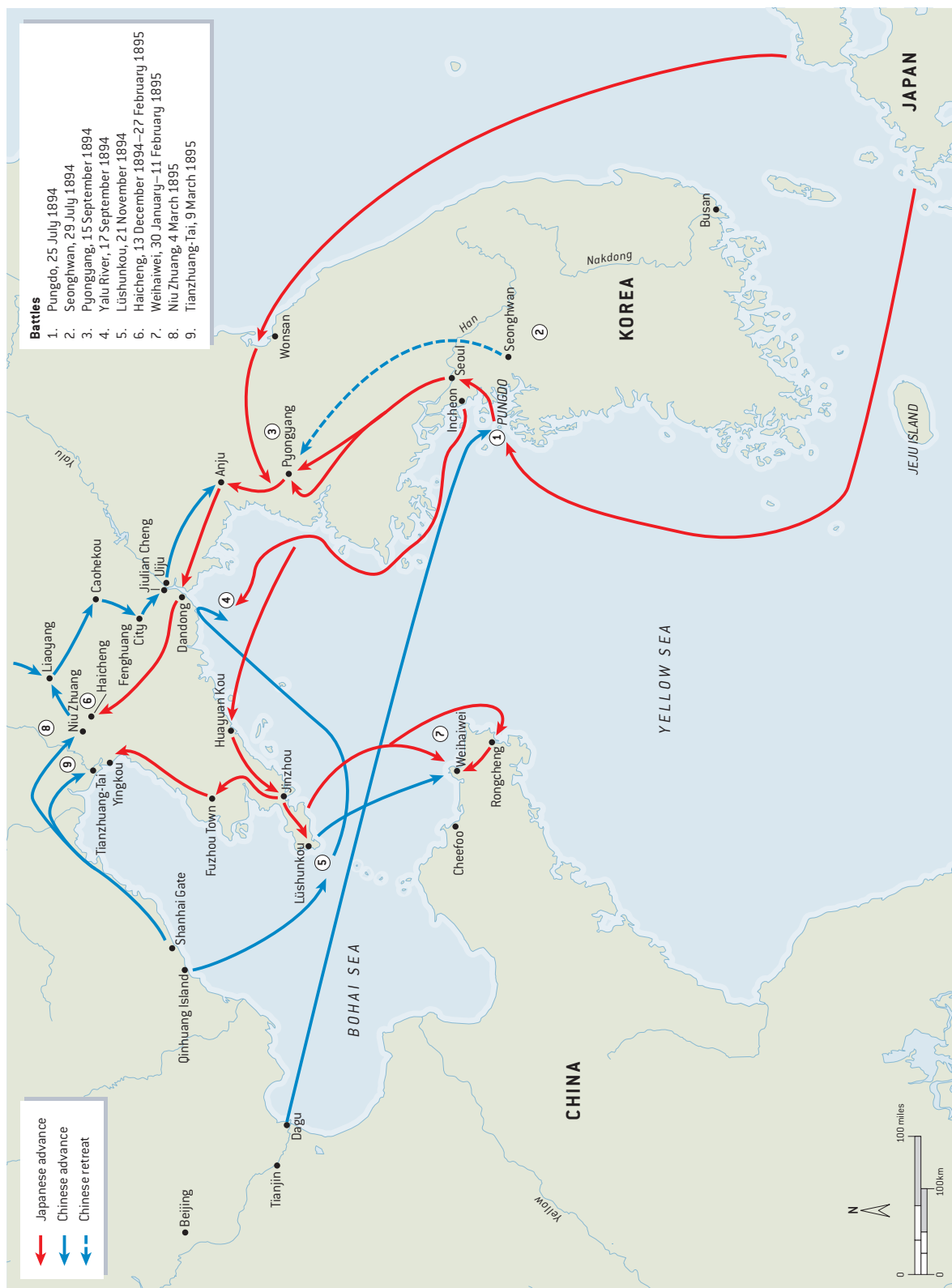
By contrast, the instructions issued to Rear-Admiral Tsuboi Kōzō, the commander of the IJN's Standing Fleet, were very different. Tsuboi's primary mission was to establish control of the Yellow Sea; secondly, he was to use any means at his disposal to crush Chinese reinforcements heading to Korea. This meant that when Tsuboi did encounter the Chinese at the battle of Pungdo on 25 July 1894, he fired first and sank *Kowshing* despite having made no declaration of war. Of the 1,195 Chinese soldiers and crew on board *Kowshing*, only 257 survived.

To prevent a repeat of the 25 July incident, the Chinese Expeditionary Army to Korea would be well escorted when it made a second effort to land in Korea. As before, the Beiyang Fleet's primary mission was to protect the Chinese forces landing in Korea. Crucially, this time Viceroy Li encouraged Ding to shoot first if he encountered the Japanese en route. On the other side, the Japanese Combined Fleet's primary mission was simple and clear; it was to locate and destroy the Chinese fleet and gain control of the Yellow and Bohai seas. Despite such ambitious intentions, however, the Japanese were not at all certain of victory; even after the battle of the Yalu River, despite having sunk five Chinese vessels, the Japanese high command saw the battle as a draw at best, because both the Chinese ironclads were still afloat and remained a threat. This determined the Japanese decision to adopt a cautious approach, probing the Chinese over the next five months before plunging the knife in for the final kill at the battle of Weihaiwei on 7 February 1895. It was because of this uncertainty that the Japanese abandoned their more ambitious war plan to capture Beijing and force China to capitulate. Ultimately, the attack on Korea served as only a diversion to drag the Chinese main force away from the mainland.

For many generations, the waters between China and Japan had been crossed by fishermen and traders from both nations, meaning that both sides had formed a clear understanding of the underwater hazards of the Yellow Sea. By the late 1890s the Japanese certainly possessed fairly good maps of Korea and at least the coastal areas of China. The Japanese had been gathering information on the area for some time and had planted ' sleeper ' agents in China and Korea for at least 20 years prior to the outbreak of the First Sino-Japanese War; moreover, Japan had also broken the simple Chinese naval codes. While little remains today of the maps available to Chinese naval officers in the 1890s, we can be sure that the Chinese had almost the same level of technical competence in navigation and seamanship as did their Japanese counterparts, for many of the Beiyang Fleet's senior officers were graduates from Britain's Royal Naval College, Greenwich. Even so, many of the Chinese officers, especially the RNC Greenwich graduates, were appointed to roles for which they lacked the necessary experience.

OPPOSITE

The First Sino-Japanese War,
1894–95.



TECHNICAL SPECIFICATIONS

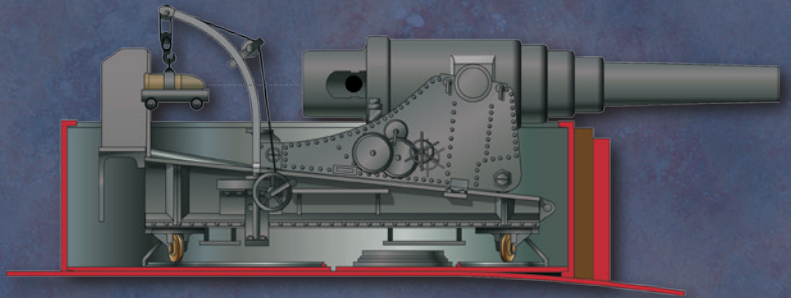
FIREPOWER

Matsushima's main armament consisted of one breech-loading 320mm/38 Model 1887 Canet gun, mounted behind the superstructure of the ship and firing aft, with a wide arc of fire ($\pm 140^\circ$) and good elevation ($-4^\circ/+10.5^\circ$). Canet guns were the creation of French engineer Gustave Canet; they were among the first generation of breech-loaders and as such were not without flaws. *Matsushima's* massive gun could fire either a 449kg armour-piercing or a 350kg explosive shell to a maximum range of 12,000m, with an effective range of 8,000m. The gun had a muzzle velocity of 610m/sec for armour-piercing rounds and 703m/sec for explosive shells. By the time the projectile reached 8,000m, the shell speed at impact fell to about 350m/sec; this meant that hits at ranges greater than 1,000m were virtually useless, especially if the target was armoured in any way. Although *Matsushima* carried 60 such 320mm rounds, with a theoretical rate of fire of one round every 10 minutes (some claimed one round every 5 minutes was possible), in reality the rate of fire was as slow as two rounds per hour or even slower. In the 5 hours of combat at the Yalu River, *Matsushima* fired a total of five rounds.

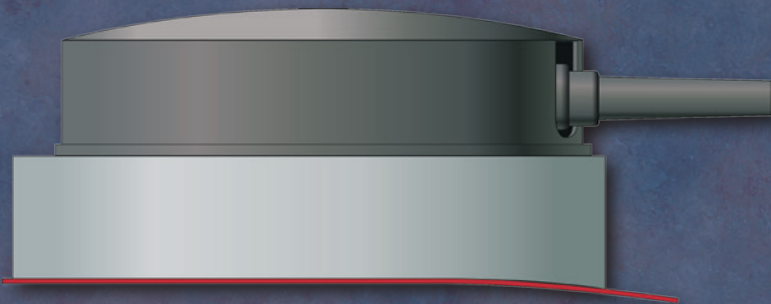
Secondary armament consisted of 12 120mm/40 Armstrong QF Mk I–IV guns, with a maximum range of 9,000m and a theoretical maximum rate of fire of 12 rounds per minute, but in reality only 4–5 rounds per minute. Muzzle velocity was 475m/sec. Ten guns were mounted on the deck, five on each side, with the remaining two located

MAIN ARMAMENT

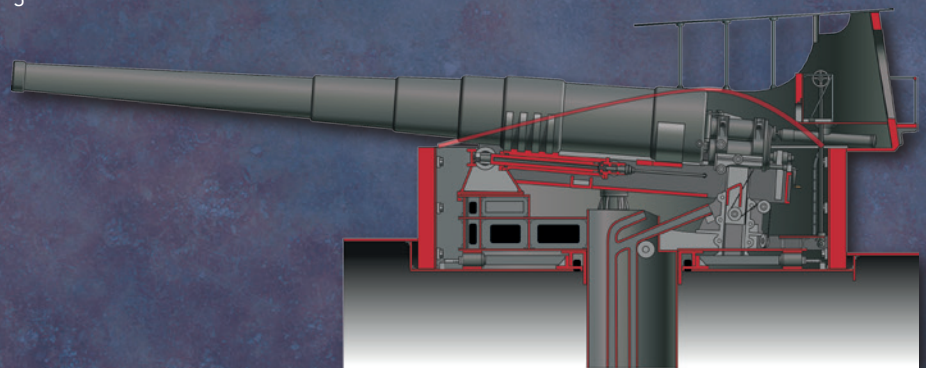
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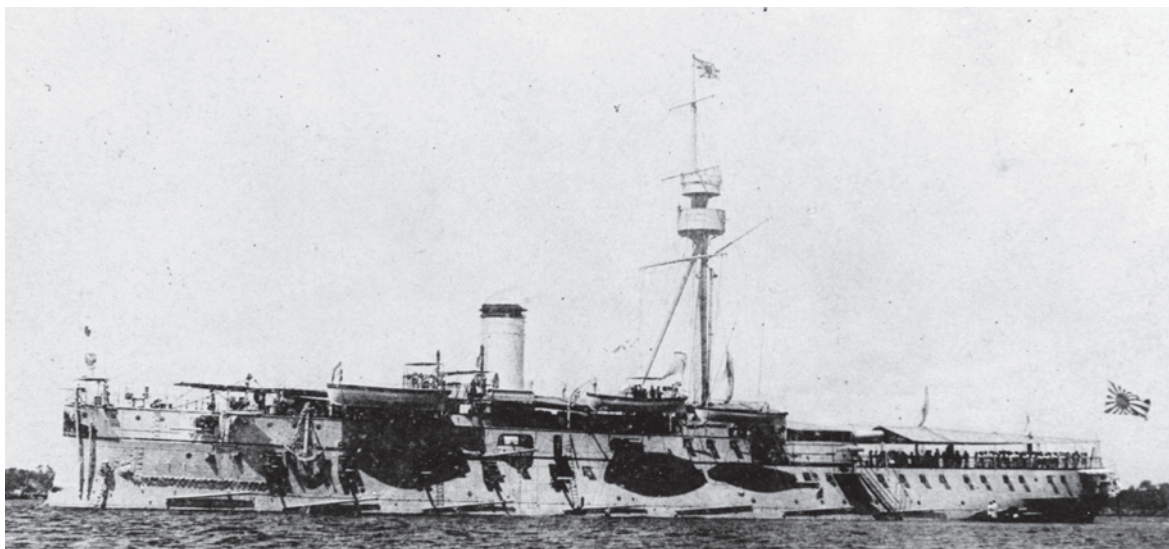


3



The 305mm Krupp gun (**1** and **2**) can be readily identified by the horizontal-sliding breech block. Loading was carried out by means of a hoist, but ramming-in the enormous shell was done by hand. In all, 128 officers and ratings crewed *Dingyuan's* two main-gun turrets (four barrels). Built in 1887 and weighing 66 tons, the 320mm/38 Model 1887 Canet gun (**3**) used by the Japanese was a generation ahead of the 305mm Krupp gun arming the two

Chinese battleships at the Yalu River. The Canet gun offered greater muzzle velocity (at a range of 1,619m, terminal velocity was 556m/sec for the 320mm gun, compared to 453m/sec for the 305mm weapon at a range of 1,080m) and thus a flatter trajectory with greater accuracy. The downside was that the gun was simply too big for the Matsushima class of vessel in which it was installed, affecting its stability.



Matsushima under way. Like *Itsukushima*, *Hashidate* had its Canet gun pointing forward instead of aft, in the manner of *Matsushima*. The number and mix of secondary guns aboard *Hashidate* and *Itsukushima* also differed from those of *Matsushima*, with more emphasis being placed on the Hotchkiss 37mm five-barrel rotary gun than the Hotchkiss 47mm single-barrel QF gun. (NH 58674 courtesy of the Naval History & Heritage Command)

in upper-deck embrasures on either side of the bow. Each of these QF guns had 120 rounds of ammunition.

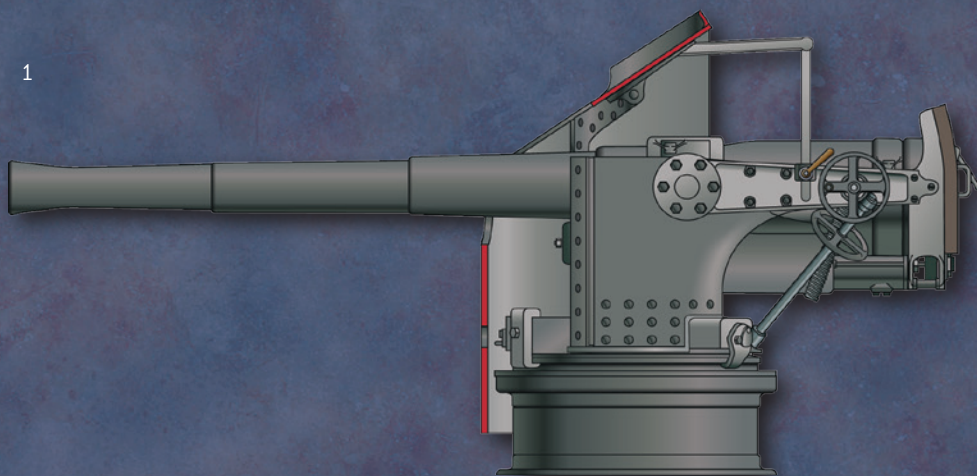
The ship was also armed with the 47mm Hotchkiss QF gun; six were mounted in sponsons on the upper deck, with a maximum range of 6,000m and a rate of fire of 20 rounds per minute. Each gun was supplied with 300 rounds. Also, two 37mm five-barrel Hotchkiss rotary guns were carried. In addition to the guns, there were four 356mm torpedo tubes, three in the bow and one in the stern. A total of 20 Type 88 'Blackhead' torpedoes were carried.

While on paper this combination of firepower looks impressive, there was a serious flaw. Weighing 66 tons and with a barrel length of 12m, the 320mm Canet gun was simply too big for *Matsushima*. The recoil from the huge weapon was simply too much for a vessel with such a small displacement, especially if firing a broadside. Also, the main gun's reloading time was impractically long. *Matsushima's* main hitting power came from its array of QF guns. Even so, the three Matsushima-class protected cruisers served their purpose well against the inefficient and poorly led Beiyang Fleet. The armament fit was formidable indeed, but the weight of the weaponry made the Matsushima-class design dangerously top-heavy, and as a result, its armour had to be reduced in an attempt to lower the centre of buoyancy to prevent the vessels from capsizing.

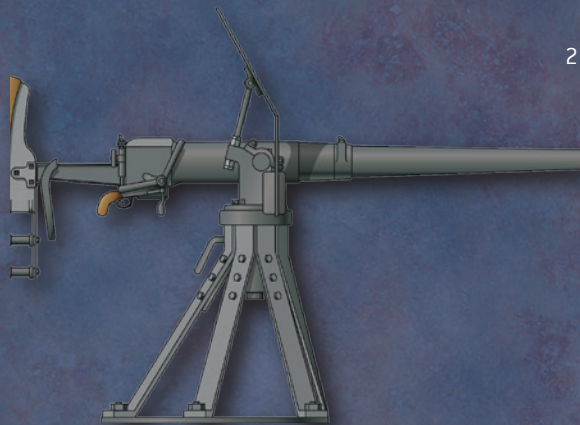
Dingyuan's main armament was comprised of four 305mm Krupp RKL/25 C/80-calibre breech-loading rifled hooped guns. The total weight of one double-barrelled carriage was a massive 69 tons, not including the turret. The RKL/25 gun could fire a solid-shot armour-piercing round (325kg) or a high-explosive/fragmentation shell (292kg), each propelled by a separate powder bag, with the largest charge weighing 72kg. Muzzle velocity was as high as 500m/sec, with a maximum range of 7,800m. The turret could be traversed by steam, or by muscle power if needed. Two turrets carried the main guns, with one turret placed on each side of the ship, slightly offset. Secondary armament was a 150mm Krupp Model 1880 RBL gun – 35-calibre, 580m/sec, 11,000m range, maximum charge 17kg – placed right on the bow for use as a

THE QF GUNS

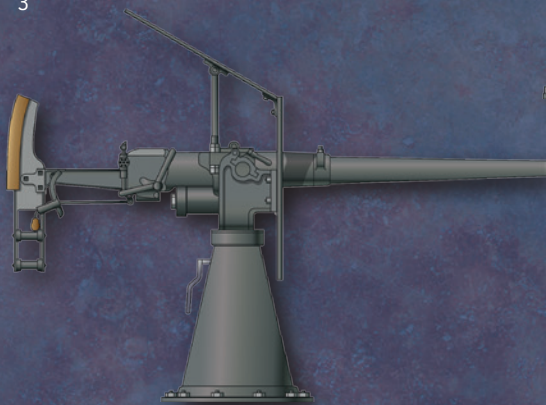
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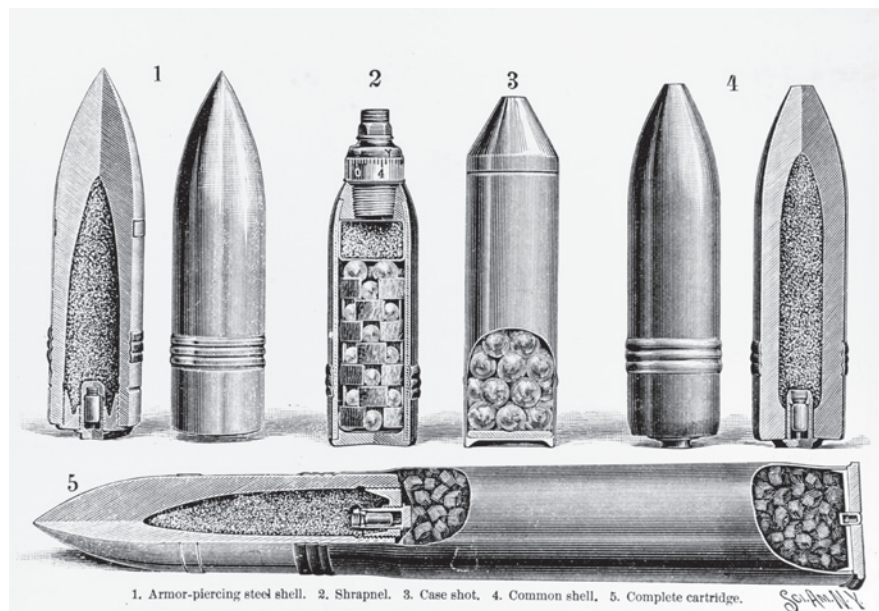
Japan was one of the first powers to field the 120mm/40 Armstrong QF gun **[1]**. At the Yalu River there were 60 such guns aboard Japanese vessels; the weapon's 5–6rd/min rate of fire gave the Japanese a key tactical advantage over the Chinese and was one of the decisive factors in the battle. Produced by Elswick Ordnance at Newcastle upon Tyne, the 57mm Hotchkiss QF gun **[2]**

saw service with the forces of more than 20 countries, including China and Japan. Boasting a formidable rate of fire, the 47mm Hotchkiss QF gun **[3]** was invented as a means of defence against the threat posed by submarines and fast torpedo boats. On the day of the battle, the Japanese fleet had a total of 53 such guns, while the Chinese mustered only 14.

chase gun, thereby allowing not only forward fire but also a traditional broadside; and, should the enemy be present to the aft of the vessel, a second 150mm gun mounted at the stern could fire to the rear, along with the main guns. Initially, the four main guns and two chase guns were not to be encased in protective turrets; these were only added during construction after a request from the Chinese, making *Dingyuan* the first German-built ship to have protective turrets. In theory, each of these six guns was to have 50 rounds, making 300 rounds in total. *Dingyuan* had secondary armament similar to that of *Matsushima*.

AMMUNITION

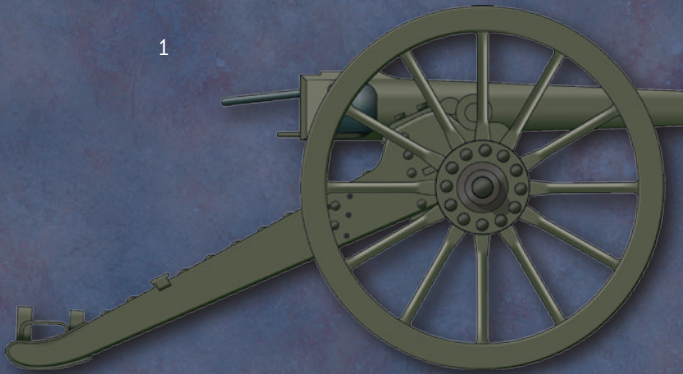
Although Shimose explosive was more stable than picric acid, and generated more heat and blast power than any other explosive available at the time, it was still dangerously unstable. Shells filled with picric acid could become unstable if the compound reacted with a metal shell or fuse casings. To overcome this deficiency, the inside of Japanese shells was painted and the Shimose explosive was separated from the body of the shell by inserting layers of wax to reduce the chance of accidental explosions. Although Britain started manufacturing Lyddite, a picric-acid explosive, in 1888, large-scale replacement of black powder in general service did not begin until after 1900, because Lyddite was still too expensive. By contrast, the Japanese pushed through the adoption of Shimose powder as early as June 1893, after conducting only six months of trial firings using a small selection of 120mm and 150mm guns. Shimose powder was approved not only for 120mm to 150mm naval artillery, but also for naval mines, depth charges and torpedo warheads. Despite the dangers, the Japanese were willing to accept the risks in a long-awaited battle with China.



Four different types of Hotchkiss rapid-fire ammunition are depicted in this 1898 illustration. [NH 73946 courtesy of the Naval History & Heritage Command]

OTHER WEAPONRY

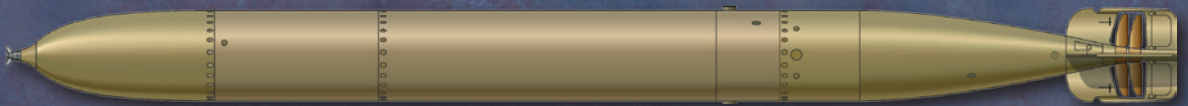
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3



Compact, light and quick to disassemble, weapons like this 75mm Krupp 'short' landing gun **[1]** in Chinese service equipped many navies during the 1880s. Such guns were small enough to be carried onshore for use by marines, but could also be mounted on the deck to provide additional firepower. The 37mm Hotchkiss rotary gun **[2]** had five barrels; it was capable of firing at a rate of 68rd/min with an effective range of 1,800m. Each feed magazine held ten

rounds. Like other QF machine cannons of the day, these weapons tended to be mounted on the crow's nest. The Schwartzkopff torpedo **[3]** was employed by both sides at the battle of the Yalu River. In the late 19th century, the torpedo was only really effective against stationary targets. At the Yalu River, all the Chinese torpedoes missed, but at the subsequent battle of Weihaiwei, the Japanese were able to sink three Chinese ships using the same type of torpedo.

The shell on the left depicts gun technology of the mid-19th century, whereas the shell on the right is a shell of the late 19th century; both are armour-piercing rounds. On the left-hand shell, the body has protruding lugs that allow the shell to 'spin' as it exits the barrel, but this did not prevent gases generated from the breech explosion that propelled the shell from escaping from the edges. By the late 19th century this problem had been solved by placing these driving bands at the bottom of the shell (missing in the photograph). These new driving bands allowed the shell to spin and prevent gases from escaping by providing a tighter fit between shell and barrel. (Author)



While newer Japanese ships such as the British-built protected cruiser *Yoshino* were fortunate to have Shimose-filled shells for the battle, China's restrictions on naval acquisition meant that the ships of the Beiyang Fleet did not have enough shells for their guns – and the shells they did possess were mainly solid armour-piercing rounds. Despite the Chinese scoring an above-average number of hits during the battle, critically, none of these hits was on vital points below the waterline.

Turning to propellant: while the Japanese had progressed to smokeless gun-cotton, the Chinese were still using a mixture of black powder and brown powder. This mixture was bundled in hexagonal pellets that were stacked longitudinally and placed in a cotton or silk bag. These hexagonal explosive pellets had a hole at the centre; as they burnt from the outside in and from the inner surface out, the burning surface remained roughly constant so that pressure would be generated at a relatively constant rate, giving the projectile a steady push up instead of the short, sharp 'kick' produced by the fast-burning powders. This innovation also meant that guns could be constructed with much thinner barrel walls, thus reducing ships' weight and improving handling.

In 1884 the IJN imported from Germany 200 356mm anti-surface ship torpedoes, commonly known as 'Blackhead' torpedoes on account of the manufacturer, Eisengießerei und Maschinen-Fabrik von L. Schwartzkopff (aka Berliner Maschinenbau). In Japan, these first 'Blackhead' torpedoes were known as the Type 84; range was 300m, speed was 22kn and the warhead contained 20kg of gun-cotton. By the 1890s the Japanese had progressed to a more advanced Schwartzkopff variant, the Type 88, boasting greater range (600m), a bigger warhead (57kg) and higher speed (26kn). Like the Japanese, the Chinese, Spanish and Russians all preferred German torpedoes over British torpedoes for two key reasons. The first was the pendulum-and-hydrostat depth regulator fitted to the 'Blackhead', making it possible for the torpedo to be set to run beneath smaller ships to reach its intended target. The second reason was that – unlike the British Whitehead torpedo, which was made of steel – the Schwartzkopff was constructed entirely out of phosphor-bronze, thus enhancing

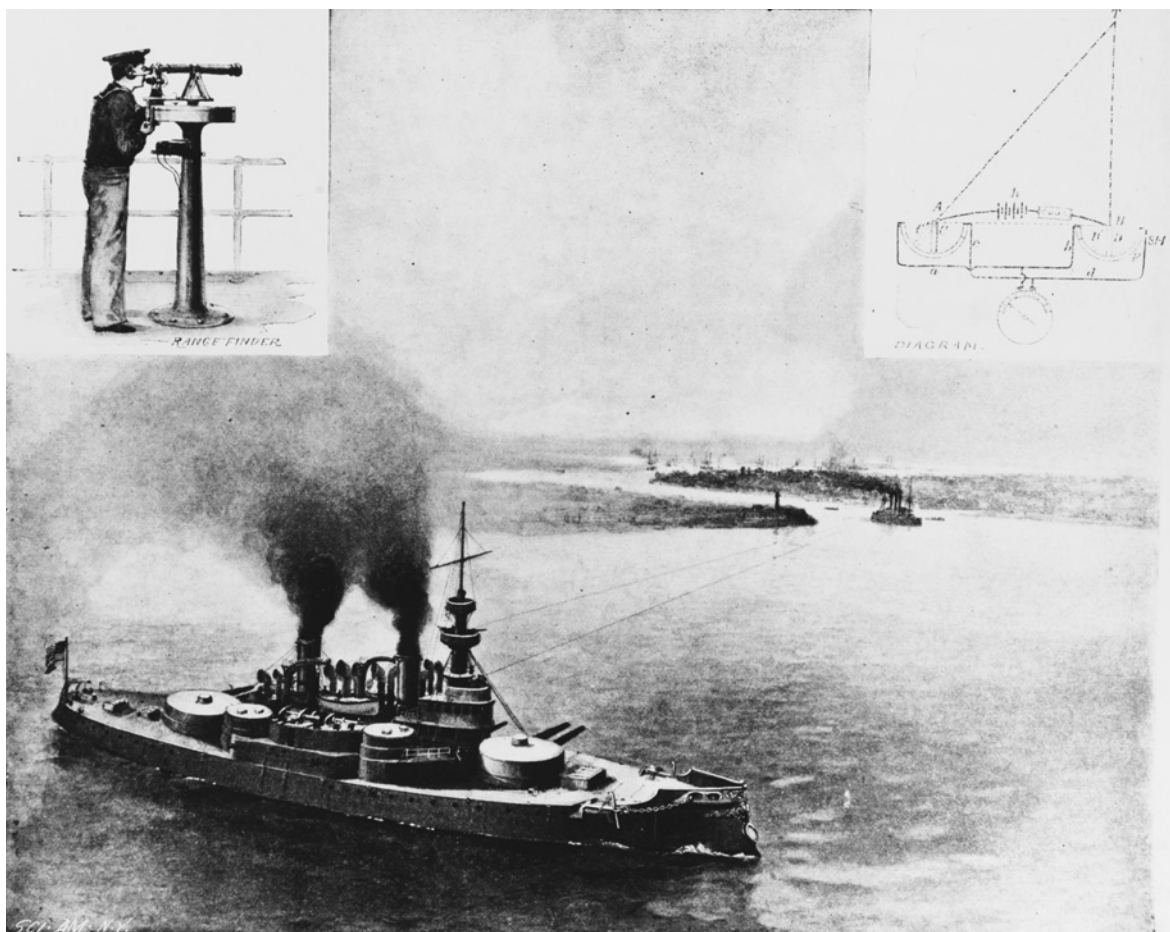
corrosion resistance. The Schwartzkopff torpedo sold for £450, significantly more than the Whitehead, priced at £280 for a 14in (356mm) steel torpedo or £380 for a 15in (381mm) bronze model.

At the battle of the Yalu River, both sides had 'Blackhead' torpedoes, and this was the first major conflict in which significant numbers of torpedoes were fired. This was a rare opportunity for the Chinese to use their torpedoes, but unfortunately, the torpedo-boat crews were poorly trained. Furthermore, their Schwartzkopff torpedoes had not been maintained properly. Consequently, the Chinese torpedo attack was a disaster: the torpedoes were fired from too great a distance, and some malfunctioned. One torpedo went directly under a Japanese ship, but because the delicate depth mechanism was set for a greater depth, it failed to hit the enemy vessel. The following day, the local fishermen concentrated their efforts on the bountiful supply of Schwartzkopff 'metal fish' in the area and sold them back to the Chinese Navy for US\$100 apiece.

RANGEFINDING AND AIMING

Gunnery in this era was notoriously poor and fire-control, if it could be called that, was profoundly inadequate. To illustrate the point, in 1870, the three British ironclads HMS *Monarch*, HMS *Captain* and HMS *Hercules* took part in a gunnery experiment by firing at a rock face 180m long by 18m tall at a range of 915m. Even against a stationary target and firing on a mirror-calm sea, the hit rate was only 47.5 per cent.

The RBL guns of those days fired very slowly, with a rate of fire of one shot every 5 minutes considered good. A ship such as *Dingyuan*, capable of travelling at 14kn, would have moved 2,160m in this time – and might have changed course and heading. Consequently, each shot required a new fire-control solution. Solutions were entirely manual, and the only means for estimating the range was the use of eyesight aided by hand-held instruments such as a sextant or prismatic compass to obtain the distance via quick arithmetic in triangulation. In those days, if you couldn't see the target, you couldn't hit it. During the battle of the Yalu River, both sides stationed sailors equipped with sextants in the crow's nests; these sailors communicated the range via a voice tube or signal flags to the gun crew. This was the norm for all the ships at the battle, with the exception of *Yoshino*, equipped since 1893 with a Barr & Stroud FA1 rangefinder. The Japanese were lucky to obtain this very rare instrument, first made in 1888, via the manufacturer of the ship, Armstrong; it would see its combat debut at the Yalu River in September 1894, not (as is often believed) during the Russo-Japanese War ten years later. Having purchased Zeiss binoculars for all Japanese naval officers as early as 1880, the Japanese well understood the importance of good optics. Once accepted in the IJN, the Barr & Stroud rangefinder was designated the Bushiki 1.5m rangefinder. The Japanese possession of the rangefinder explains in part how the IJN's Flying Squadron, of which *Yoshino* was the flagship, could so speedily overwhelm the Chinese cruisers *Chaoyong* and *Yangwei* at a range of 2.7km. The rangefinder was guaranteed by the manufacturer to have a margin of error of just 1 per cent; but as impressive as this sounds, it meant that a torpedo could miss its target by up to 10m at a range of



Before the invention of the Barr & Stroud rangefinder, rangefinding was a slow and cumbersome job. Two observers positioned as far apart as possible, usually with one on the mast and the second on deck, were connected by telephone with a third person who undertook some rapid arithmetic to determine the range. [NH 73949 courtesy of the Naval History & Heritage Command]

1,000m, and by 20m at a range of 2,000m. Even so, this innovation proved so effective that by 27 May 1895, only eight months after the battle of the Yalu River, every ship in the IJN was equipped with a Barr & Stroud rangefinder.

On the issue of gun direction, it was also a time of transition. For most of the ships that fought at the Yalu River each gun could only be fired on the command of the gun captain, but four Armstrong-built ships at the battle – two Japanese (*Naniwa* and *Takachiho*) and two Chinese (*Jingyuan (CY)* and *Jiyuan*) – each had an electric circuit for salvo firing, as well as a rudimentary gun director. Both *Naniwa* and *Takachiho* served in the IJN's Flying Squadron; even though they had slow-firing RBL guns, their gunnery was much more accurate than that of the other ships present at the battle.

In terms of aiming, most of the big guns of the day still used primitive tangent sights. Most of the QF guns, however – especially the 120mm/40 QF guns on the newer Japanese ships – were equipped with rocking-bar sights for direct fire. The rocking-bar (or bar and drum) sight had an elevation scale, could mount a telescope as well as the open sight and provided a small amount of horizontal deflection, thereby allowing the telescope (or open sight) to be aimed at the target independent of the barrel elevation.



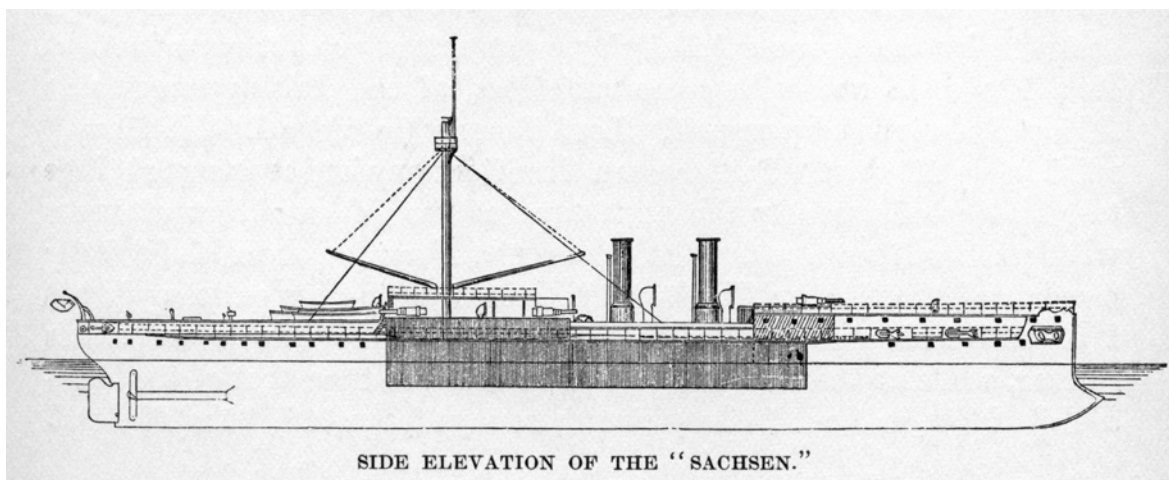
The Barr & Stroud rangefinder revolutionized naval warfare by allowing a single operator to obtain range accurately and rapidly. In this Japanese bas-relief, the Barr & Stroud rangefinder can be seen in use. During the First Sino-Japanese War, the Japanese cruiser *Yoshino* was the only ship to have this new technology. [Author]

PROTECTION

Dingyuan was designed with a central armoured citadel box, 43m long with a watertight raft extending forward and aft protected by a 76mm armoured deck lying just below the waterline. The design of the ship also helped with its protection. While the casemate could protect the boilers and engines, coal bunkers located outboard of the machinery spaces and the coal within were helpful in providing additional protection (60cm of coal was found to be equivalent to 2.5cm of armour).

Protected cruisers were expected to fight at ranges of about 1,000m. While the Chinese shell trajectories were still parabolic, the Japanese projectiles could hit almost horizontally. The protection was arranged so that if the unarmoured ends were penetrated, little water would be able to flow in as the spaces would already be full, and the ship would remain buoyant and stable. *Dingyuan* boasted 16 transversal watertight compartments; in theory, if all the watertight doors were sealed, this would give the vessel 181 watertight compartments. These were not always effective, however. Closing these watertight doors was troublesome and slow (this was the problem encountered when HMS *Victoria* was accidentally rammed and sunk by HMS *Camperdown* on 23 June 1893); moreover, when the Japanese captured *Zhenyuan*, the sister ship of *Dingyuan*, after the battle of the Yalu River they found that many of the rubber seals on the watertight doors were unserviceable. It is unclear to what extent this issue affected the Chinese ships that were sunk at the Yalu River.

Dingyuan was equipped with state-of-the-art 'compound armour', an invention spearheaded by Britain in the 1880s as a response to the emergence of armour-piercing shells and the continual need for reliable protection against the increasing size of naval ordnance. Compound armour was an attempt to combine the benefits of two different materials: the hardness of steel with the toughness of iron and wood. While there were



Both *Dingyuan* and *Zhenyuan* were based on an enlarged Sachsen-class frigate design. Note the casemate in the central region, which protected the core of the ship, and the ram at the bow. The main difference between the German design and the subsequent Chinese ships was the addition of a flying bridge and second-level walkway and turret protection for the main guns. [Interim Archives/Getty Images]

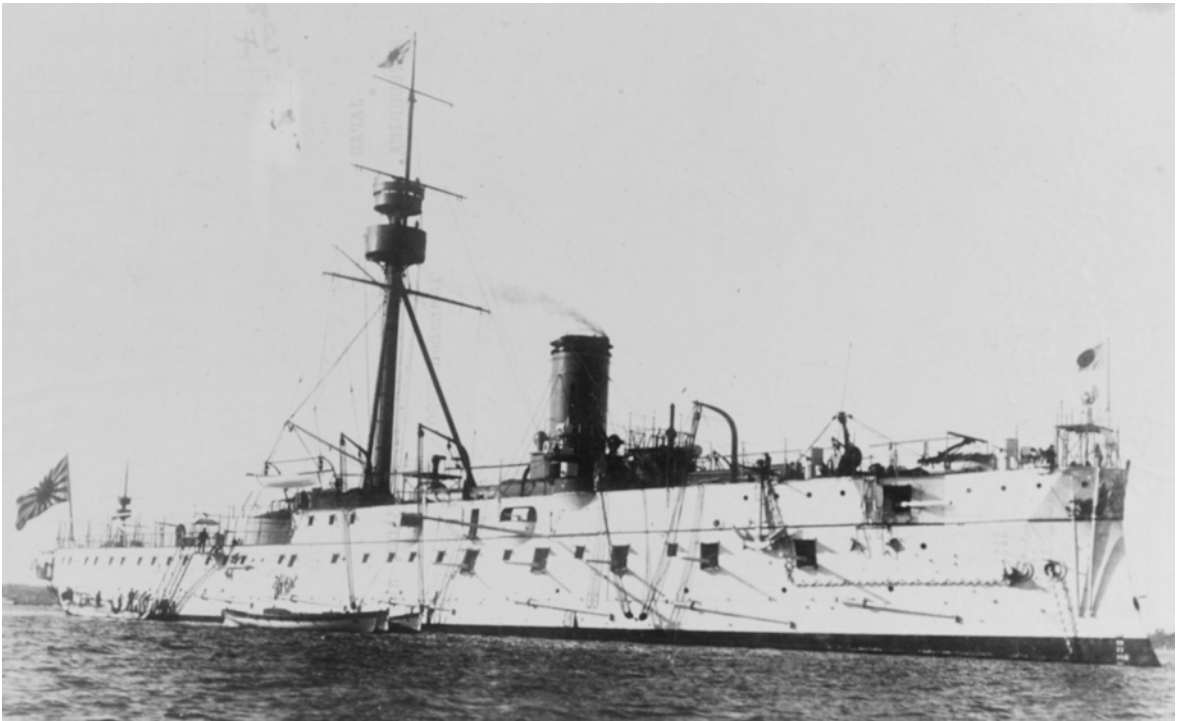
many combinations of compound armour, each with its own unique sandwich of wrought iron and high-carbon steel, the version chosen for *Dingyuan* was based on high-carbon steel on the outer surface backed with a thick layer of teak wood and a wrought-iron base. To better protect the brittle high-carbon steel, the whole structure was bolted onto the ship, but the bolts did not penetrate the outer steel surface.

Given the secrecy of this new type of armour, Britain banned its export to Germany, prompting the Germans to develop their own version of compound armour; *Dingyuan* was the first German-built ship to feature this innovative protection. Compound armours were approximately 25 per cent superior in strength to their wrought-iron predecessors, meaning that a 250mm compound armoured plate was equivalent to a 315mm iron plate. During subsequent analysis of the battle of the Yalu River, it was discovered that the German compound armour had been able to withstand a direct hit from *Matsushima's* main gun at a range of 2,300m, with the gun succeeding only in denting the compound armour by 7–10cm. While this seems impressive, the inability of the Japanese 320mm shell to penetrate may have been due to faulty fuses.

The years between the completion of *Dingyuan* and *Matsushima* witnessed a new phase in the development of armour. Compound armour was superseded by new developments such as Harvey steel, which gave the right sort of protection but offered a further reduction in weight. Its manufacture involved selective hardening of the steel plate; while the front surface was converted to high-carbon steel (1 per cent carbon), the carbon content decreased towards the back of the steel plate (0.1–0.2 per cent). According to the manufacturer, 330mm of Harvey steel armour offered the same protection as 390mm of nickel-steel armour.

MOBILITY

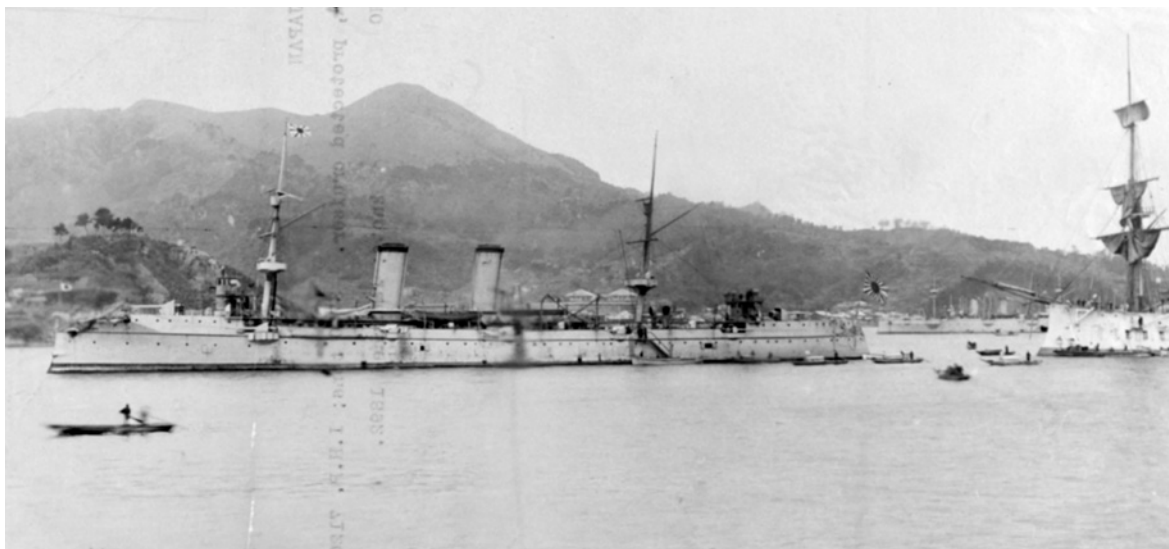
Matsushima's maximum design speed was about 16kn, but the protected cruiser was not the IJN's fastest vessel: *Yoshino*, the British-built cruiser, could reach 23kn, making it the fastest ship at the battle of the Yalu River. Initially, the Japanese fleet was formed



up in two columns, with *Yoshino* being the leader of the faster Flying Squadron; the cruiser's speed would prove to be a battle-winning asset for the Japanese.

Another view of *Matsushima*. Note the booms along the waterline; they were for erecting anti-torpedo nets when the ship was stationary. (NH 58804 courtesy of the Naval History & Heritage Command)

Sea-keeping abilities: a comparison				
	<i>Matsushima</i>	Elswick protected cruiser	<i>Dingyuan</i>	Sachsen ironclad frigate
Laid down	1888	1892	1881	1875
Type	Protected cruiser	Protected cruiser	Ironclad battleship	Ironclad frigate
LWL, beam, draught	89.9m, 15.6m, 6.0m	129.5m, 14.6m, 7.4m	94.5m, 18.3m, 6.1m	92.1m (est.), 18.4m, 6.32m
LWL:beam ratio	5.76:1	8.86:1	5.16:1	5.01:1
Beam:draught ratio	2.56:1	1.97:1	3.00:1	2.91:1
Displacement (full)	4,556 tons	9,757 tons	7,670 tons	7,514 tons
Block coefficient (Cd)	0.5	0.685	0.65<0.7 (est.)	
Metacentric height (GM)	0.8m	0.7m	0.6m (est.)	0.63m
Roll period	13.2 seconds	13.0 seconds	Long rolling period. Severe angle of rolling. Seawater awash on deck.	



In addition to its four 150mm/40 QF main guns, HJMS *Yoshino* had eight 120mm QF Mk I–IV and 22 47mm Hotchkiss QF guns, giving a total of 34 barrels. During the battle of the Yalu River, *Yoshino* assisted in sinking the Chinese cruisers *Jingyuan* and *Zhiyuan* and severely damaging *Laiyuan*. In 1895, *Yoshino* took part in the invasion of Taiwan. The ship was sunk in an accidental collision with another Japanese warship, the armoured cruiser *Kasuga*, on 15 May 1904 during the Russo-Japanese War. [NH 58808 courtesy of the Naval History & Heritage Command]

From the table above, we can derive some observations of the sea-keeping abilities of the two competing vessels. To compensate for the lack of data for *Dingyuan*, the present author decided to use the Sachsen-class frigate, a vessel to which *Dingyuan* owed much of its design, as a close estimation of how *Dingyuan* would have handled during the battle of the Yalu River. For comparison, I have included a protected cruiser of the same period, a popular design from Elswick of Newcastle upon Tyne.

The first aspects to consider are the LWL:beam ratio and the beam:draught ratio. A high LWL:beam ratio (low beam:draught ratio) would indicate that *Matsushima* had better fuel economy (given the same speed) than *Dingyuan*, but being a ‘narrower’ ship also meant that *Matsushima* was inherently less stable. The *Jeune École* concept informing *Matsushima*’s design requires a fast ship with a heavy punch. The block coefficient (Cd) is the ratio of the vessel’s underwater volume to that of a rectangular block having the same length, beam and draught. A higher ratio means the ship hull is inherently ‘blockish’ in shape, making it good for carrying cargo but limiting its speed. From the table we can see that *Matsushima*’s Cd is much less than that of the Sachsen-class design and the Elswick design. The fact that the Cd ratio is as little as 0.5 means that *Matsushima*’s underwater form was dangerously ‘small’; this factor, coupled with the vessel’s huge and heavy main gun being mounted so high up, means that *Matsushima* was inherently a top-heavy design with poor sea-keeping characteristics.

The next aspect to consider is the metacentric height (GM) number. GM is a measurement of the initial static stability of a floating body, measuring a ship’s ability to right itself when heeling over. While a larger metacentric height implies greater initial stability against overturning, the righting arms (a force that returns the vessel to its upright position) will be also large – indicating a sharp and forceful rolling motion, high acceleration forces which could be dangerous to the ship, compromising the comfort of its crew and, more importantly, the accuracy of its gunnery. This simple data analysis confirms the post-battle finding that *Matsushima* suffered from a stability issue affecting the discharge of the ship’s main weaponry.

Although the Chinese left us no analysis of how *Dingyuan*'s sea-keeping fared during the battle, from the German naval archives we know that the Sachsen-class design had a bad reputation for its long and rolling motion. Coupled with a lower-than-normal freeboard – the distance between the waterline and the upper deck level – this meant that during sharp turns, even in calm seas, *Dingyuan* could also suffer from the same problems, having an excessive roll with the deck awash with seawater. In order to correct these design shortcomings, the last of the four Sachsen-class frigates, SMS *Baden*, was redesigned, making it vastly different from the previous three vessels. Despite such careful reconstruction, however, the critical design shortcomings were not entirely resolved. As a result, *Baden* was the last of Sachsen-class ships.

COMMUNICATIONS

Relying upon flags and signal lamps, naval communications of the early 1890s were akin to those of the Nelsonian era a century earlier; wireless telegraphy would not be invented until 1897. Flag semaphore, an age-old naval tradition, was used by both the Chinese and Japanese in 1894. The kerosene-fuelled Begbie lamp, incorporating a lens to focus its light over long distances, was common in the years before wireless telegraphy. Having grown in popularity since the 1860s, Morse code was used by both sides at the Yalu River. With the Chinese language being based on the use of characters rather than an alphabet, the Chinese employed a four-digit decimal code for electrically telegraphing messages, making transmission using signal lamps more cumbersome. The Chinese naval codes were just a development of the civil four-digit telegraphic codes and were easily broken by the Japanese before 1894. The Japanese language, on the other hand, could be more easily romanized and thus adapted to signal lamps. The Chinese did not manage to break the Japanese naval codes, partly due to the fact that the Chinese had no such awareness and also partly driven by the scruples of Li Hongzhang, who believed that such efforts were dishonourable and inappropriate.



A model of *Zhiyuan* in the Hong Kong Maritime Museum. Note the protruding bow torpedo tube.
[Author]

Many Japanese and Chinese naval personnel travelled to Europe to take delivery of ships built there; some never made it home. In St John's Westgate and Elswick Cemetery in Newcastle upon Tyne lie three Chinese sailors of the 19th century. This is the grave of Chen Shoufu from Fujian, who was buried on 7 May 1887. Chen came to Newcastle under the leadership of Deng Shichang to pick up HICMS *Zhiyuan*. At the time when this picture was taken [February 2018], the grave was being refurbished at the expense of the Chinese Embassy in London. [Author]



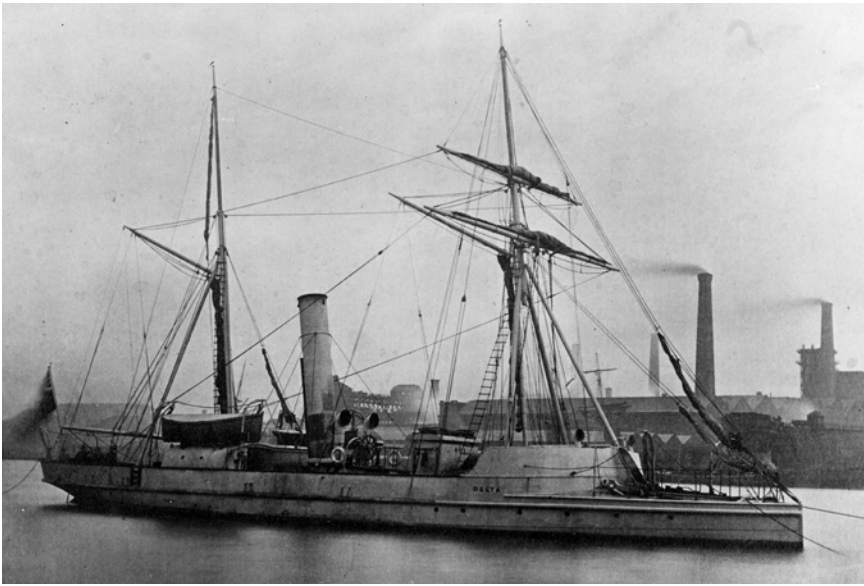
THE COMBATANTS

THE BEIYANG FLEET AND ITS FOREIGN ADVISORS

The Beiyang Fleet was essentially a modernized local militia. The NNS, raised by Viceroy Li Hong-zhang, was largely funded by taxes collected in the five provinces he ran. Li first created the Beiyang Army after the Taiping Rebellion and later added a naval component, utilizing imported Western weaponry and trainers. Zhili province, of which Li was the viceroy, was key to the defence of Beijing and the safety of the Emperor, meaning that Li was given priority over other viceroys in funding, much to their disgust. Jealousy soon developed into a whispering campaign directed against Li, resulting in his being sidelined and starved of funds. This was a key factor contributing to the defeat of the Beiyang Fleet at the Yalu River.

Able officers such as Liu Bu-chan, who later served as captain of *Dingyuan*, could be awarded a naval scholarship at Britain's Royal Naval College, Greenwich. Unfortunately, Greenwich had only six places allocated for Chinese students; Liu narrowly failed to gain entry, but in 1878 was allocated a trainee position on board HMS *Hercules* instead. Along with Liu, 11 other naval cadets travelled to Britain in 1877, while a further group of 26 went to France to study naval architecture and shipbuilding. Three students from this naval-architect class, Zheng Qing-lian, Wei Han and Chen Zhao-ao, were to go to the Stettiner Maschinenbau AG Vulcan shipyard in Germany and supervise the building of *Dingyuan* and *Zhenyuan*.

After returning to China in 1878, Liu was given command of HICMS *Zhenbei*, a mosquito boat in the Beiyang Fleet. Having the advantage of an overseas education,



A view of the gunboat *Delta* (renamed *Zhenbei* in Chinese service). Vessels such as this one represented a cheap alternative to larger ships, but were compromised not only by their small size but also by the fact that each gunboat had only one gun, pointing forward and with a limited arc of fire. To train the gun, it was necessary to turn the whole gunboat. [NH 1595 courtesy of the Naval History & Heritage Command]

he was quickly promoted to command rank, probably much too fast. In 1890 he argued with Captain William Lang RN, the Beiyang Fleet's chief training officer, resulting in the latter's resignation. Lang's first encounter with China was in 1863 when he was placed in charge of the four British gunboats *Alpha*, *Beta*, *Gamma* and *Delta* (later renamed as *Zhendong*, *Zhennan*, *Zhenxi* and *Zhenbei*) as part of the Lay-Osborn Flotilla. The departure of this renowned disciplinarian, who had joined the NNS in 1882, had a detrimental effect on the Beiyang Fleet, leading to a decline in standards and discipline.

After Lang's departure, the British government withdrew all British naval advisors from China and terminated all cooperation on naval matters, including training Chinese naval cadets. Furthermore, Admiral Ding Ru-chang, the commander of the Beiyang Fleet and deputy naval minister, was not a disciplinarian, even breaking several disciplinary codes himself by renting out several of the shore facilities to compensate for the shortfall in the budget. This deterioration in discipline was in part encouraged by the corruption in the Manchu court, where a large part of the naval budget was syphoned off for the pleasure of the Empress Dowager in a series of increasingly outlandish construction projects. Hampered by his lack of funds, Li failed to condemn the bad behaviour of his sailors; if he had sought to punish malefactors, he might have faced a mutiny.

In 1894, the Beiyang Fleet had 21 foreign naval advisors and 13 shore-based foreign instructors; most were British, but there were also five Germans, one American and ten of unknown nationality (but likely to be British). Another notable foreigner in the Beiyang Fleet was Lieutenant William Ferdinand Tyler RNR, who held the rank of commander and was 2IC to Captain Liu on *Dingyuan*. (*Dingyuan's* gunnery instructor, Thomas Nicholls, and the ship's engineer, Alexander Purvis, died at the Yalu River.) According to Tyler's memoir, while there were problems within the Beiyang Fleet, the Chinese sailors' morale was good and they were able sailors; the problem, as Tyler saw it, lay in the shortcomings of their officers (Tyler 1929). At the battle of the Yalu River,



ABOVE LEFT

Ding Ru-chang. After the destruction of the Beiyang Fleet, Ding refused Itō's offers of political asylum and instead committed suicide by an overdose of opium. (Universal History Archive/UIG via Getty Images)

ABOVE RIGHT

Philo Norton McGiffin's Beiyang Fleet uniform is displayed in the Hong Kong Maritime Museum. Note the double golden dragon motif on the sleeve as well as traditional Chinese knots as fastenings. Originally dark blue, the uniform has faded somewhat over time. [Author]

Dingyuan's four main guns – slow-loading 305mm RBL weapons – fired a total of 120 rounds, giving an average of 30 rounds per barrel. By comparison, the Japanese protected cruiser *Naniwa* fired a total of 33 rounds (average 16 rounds per barrel) with its more modern twin 260mm Krupp L/35 gun, suggesting that the gunnery drills of the Chinese were superior, despite being hampered by the use of older technology.

The small group of Germans serving in the Beiyang Fleet included: 'Major' Constantin von Hanneken, a former German Army gunner; Gustaff H. Hoffman, formerly of the German Army's Grenadier-Regiment Nr. 1, who served as chief superintendent engineer aboard *Jiyuan*; and J. Albrecht, *Dingyuan's* deputy head of engineering, who was wounded at the Yalu River. In an article published in the *North China Daily News* on 18 October 1894, Hoffman rated the Chinese sailors highly in terms of bravery and competence, and praised their promptness in obeying orders. Hanneken had a low opinion of the Chinese officers, but did not escape criticism himself, being blamed in some accounts (for example, Allen 1898) for bungling vital orders during the heat of battle.

The colourful Chinese adventures of the one American in the Beiyang Fleet, Philo Norton McGiffin, reached a wide audience because of an article he wrote in *The Century Magazine*. McGiffin arrived in China in April 1885 after he was made redundant in a rapidly contracting US Navy. With US\$1,000 of severance pay in his pocket, he went to China to seek his fortune. Through connections McGiffin managed to secure an interview; and after passing the Chinese Navy exam (albeit with a

OFFICERS OF THE BEIYANG FLEET

DENG SHI-CHANG

Deng Shi-chang (1849–94), a native of Guangdong and the son of a tea merchant, attended a missionary boarding school in Shanghai. In 1867 Deng entered the prestigious Naval Academy in Mawei, Fujian province, graduating in 1874 with excellent results. He was assigned his command, the transport boat HICMS *Chenhang*, immediately upon graduation. In May 1874, when the Japanese invaded Taiwan, Deng distinguished himself in the campaign and was awarded a promotion to lieutenant.

Deng went to Newcastle upon Tyne twice to take charge of newly constructed Armstrong-built cruisers: in 1880 he took delivery of the cruisers HICMS *Yangwei* and HICMS *Chaoyong*, and in 1887 safely sailed the cruiser HICMS *Zhiyuan* to China. As a reward, Deng was appointed the captain of *Zhiyuan*, the Beiyang Fleet's most modern

ship. In less than 18 years, Deng rose to be promoted rear-admiral in charge of administration in the Beiyang Fleet.

At the battle of the Yalu River, Deng was in command of *Zhiyuan*, the cruiser being armed with a large number of smaller-sized naval guns as opposed to a small number of larger guns. After exhausting all his ammunition, Deng attempted to ram a Japanese warship (Japanese accounts say this was *Naniwa*, while Chinese accounts say it was *Yoshino*), but *Zhiyuan* was hit in the bow by a shell fired from either *Naniwa* or *Takachiho*; the impact caused a massive explosion and sank *Zhiyuan*. Some 245 officers and crewmen went down with the Chinese cruiser. Deng refused to be rescued and drowned at sea with his pet dog Sunshine.

CONSTANTIN VON HANNEKEN

Born in Trier, Germany, Constantin Alexander Stephan von Hanneken (1855–1925) followed his father into the military, but his career as an artillery officer was cut short in 1877 when he left the Army under less than auspicious circumstances. He then travelled to China and met Gustav von Detring (later Hanneken's father-in-law), an advisor to Viceroy Li Hong-zhang. Hanneken was a polyglot whose languages included German, English, French, Italian, Latin and later Chinese; through Detring's connections Hanneken secured a position as Li's military advisor.

Hanneken was involved in the construction of coastal positions at Lüshunkou and Weihaiwei, the standardization of military equipment and the development of docks and a military academy in Tianjin. In 1891, he left China, but happened to have returned just as the Korean crisis

erupted. Hanneken survived the sinking of the transport ship SS *Kowshing* on 25 July 1894 and in August 1894 was controversially appointed as chief instructor with the brevet rank of vice-admiral. At the battle of the Yalu River, Hanneken was aboard HICMS *Dingyuan*; controversially, he was accused of interfering with Admiral Ding Ru-chang's orders, disrupting the Chinese battle formation during the critical phase of the battle.

After the war, Hanneken founded a newspaper in Tianjin and bought shares in that city's Astor Hotel; he later turned to mining. Hanneken lost his fortune in 1917 after China declared war on Germany. After 1918, Hanneken tried to reclaim his 'lost' assets, but died before a settlement was reached. The money did become a part of his estate, however, making his widow and children very rich indeed.

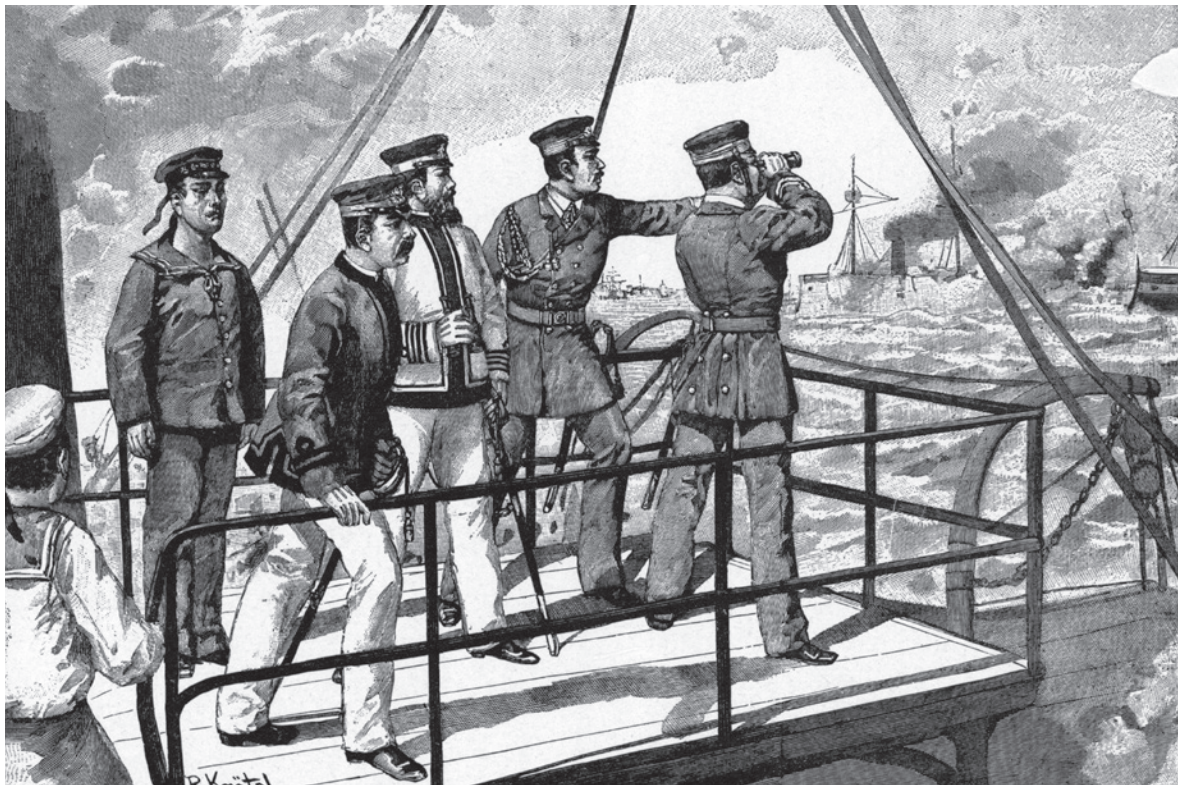
mediocre 60 per cent), he was given a job as an instructor in the Tianjin State Arsenal with a very good salary (130 Taels of silver a month, equivalent to over £720). McGiffin worked as a hydrographic surveyor on the Korean coast and was tasked with building and heading a new naval college in Weihaiwei which remains in service with China's navy today. He was incorruptible, unlike many of his Chinese colleagues, and soon gained the trust of Li Hong-zhang. The Beiyang Fleet was partially organized and trained by McGiffin, and he would serve as an advisor aboard the ironclad *Zhenyuan*

during the battle of the the Yalu River. According to McGiffin, the Chinese defeat at the battle stemmed from their failure to understand the essence of the modern knowledge he wanted to teach them, and the outright cowardice of some Chinese officers during the battle. McGiffin was severely wounded during the battle and returned to the United States, subsequently suffering from mental instability as a result of his wounds.

THE IMPERIAL JAPANESE NAVY AND ITS FOREIGN ADVISORS

By the 1890s, Japan as a nation had undertaken more than 20 years of reforms. Unlike the modernization of China which was based on the superficial importation of technology, the reforms embarked upon by the Japanese involved making fundamental changes in government, lifestyle and social structure. Three changes that gave the Japanese the edge over the Chinese in 1894 were: the creation in 1883 of a national government agency dedicated to naval matters; a national conscription system (from 1873) to supply a trained workforce in response to a national emergency; and the development of a logistics system to support military ventures on land and at sea.

A Western depiction of Japanese naval officers during the First Sino-Japanese War. The uniforms and many of the traditions of the IJN were modelled on those of the British Royal Navy. [Bettmann/ Getty Images]



OFFICERS OF THE IMPERIAL JAPANESE NAVY

ITÔ SUKEYUKI

Born in Kagoshima City, Itô Sukeyuki (1843–1914) studied naval engineering and gunnery at the Kobe Naval Training Centre and served on a number of ships including *Nisshin*, *Hiei*, *Ryūjō* and *Fusō*. In 1885, Itô travelled to Newcastle upon Tyne and brought the protected cruiser *Naniwa* back to Japan. In 1886, Itô was promoted to rear-admiral in charge of the Imperial Navy Academy and six years later transferred to Yokosuka naval district as vice-admiral to take command of the Standing Fleet.

In 1894, Itô was appointed as commander-in-chief of the Combined Fleet and routed the Beiyang Fleet in all three naval engagements of the First Sino-Japanese War. He was aboard *Matsushima* during the early part of the battle of the Yalu River. At around 1500hrs on 17 September 1894, *Matsushima* was hit by fire from *Zhenyuan* that tore open

the deck and ignited ready ammunition, causing nearly 100 casualties. Itô was forced to abandon *Matsushima* and transfer his flag to *Hashidate*.

During the battle of Weihaiwei, as a Chinese defeat appeared certain, Itô made an appeal to Admiral Ding – a personal friend – advising him to accept political asylum in Japan until the end of the war, and then to aid China in setting its policy on a sound basis. When Ding read this message he was visibly moved, but chose to commit suicide by overdosing on opium. Itô insisted that Ding's body be treated with respect.

On the conclusion of the First Sino-Japanese War, Itô became the IJN's chief-of-staff, a position he maintained throughout the Russo-Japanese War.

TSUBOI KÔZŌ

Tsuboi Kôzô (1843–98) enlisted in the navy of the Chōshū Domain and was commissioned into the IJN in 1870. On account of his impressive performance while training aboard the steam screw frigate USS *Colorado*, Tsuboi was sponsored by Rear Admiral John Rodgers of the US Asiatic Squadron and attended the University of Columbia in New York during 1872–74. He returned to Japan in 1874 and served in a variety of roles, moving between warship commands and shore postings, notably as captain of the protected cruiser *Takachiho* while also serving as the Standing Fleet's chief-of-staff in 1889–90. Promoted rear-admiral in September 1890, Tsuboi commanded the Sasebo Naval District before becoming commandant of the Imperial Japanese Naval Academy in 1892, and then headed the

Naval Staff College from 1893.

At the start of the First Sino-Japanese War, Tsuboi was the commander of the IJN's Flying Squadron, aboard *Yoshino*. During the battle of Pungdo his aggressive tactics took the Chinese by surprise and gave the Japanese the upper hand in the naval war. At the battle of the Yalu River, his innovative tactics and aggressive manoeuvring contributed much to the final destruction of the Chinese Beiyang Fleet. Celebrated as a national hero in Japan, Tsuboi was ennobled with the title of baron in August 1895 and promoted vice-admiral the following year. In 1896 he was appointed commander-in-chief of the IJN's Standing Fleet, and in 1897, commander of the Yokosuka Naval District. He died on 1 February 1898.

All Japanese citizens, from members of the royal family to labourers, were liable for national service. Initially, Japanese conscription involved three years of service, followed by two years in the first reserve and another two years in the secondary reserve, but by 1890 the conscription programme extended the first-reserve commitment to four years and four months and the second-reserve commitment to five years. After this, the obligation to the state continued, for the demobilized reservists had to serve in the local militia until the age of 40. This equated to 23 years of military service, surely a world record. The IJN attracted the best recruits, for the pay was double that of the Imperial Japanese Army. Although Emperor Meiji had

OPPOSITE

Itō Sukeyuki, also known as Itō Yūkō, was and is regarded as the greatest officer of the IJN. He presided over two major victories, over China in 1894–95 and Russia in 1904–05. In 1898 he became an admiral and in 1906, a fleet admiral. In 1907, he received the title of *hakushaku* [count]. (NH 74446 courtesy of the Naval History & Heritage Command)

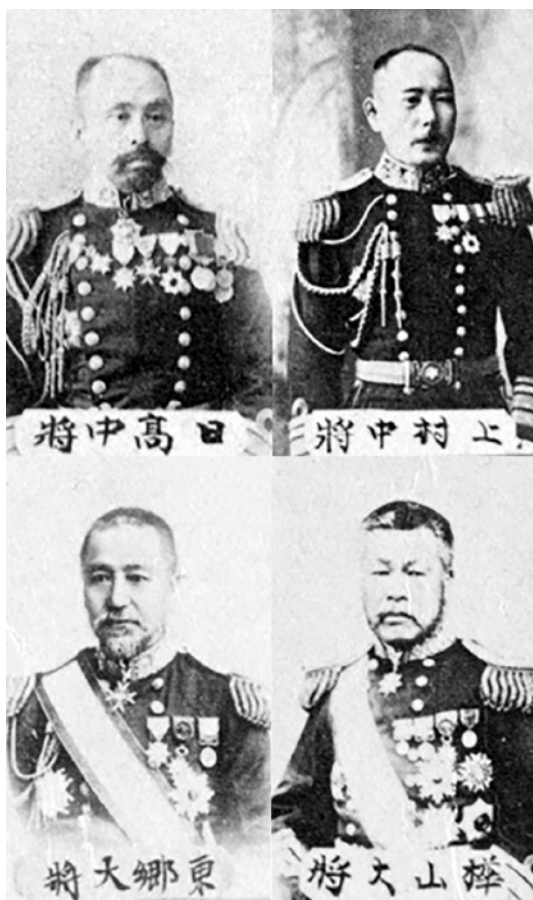
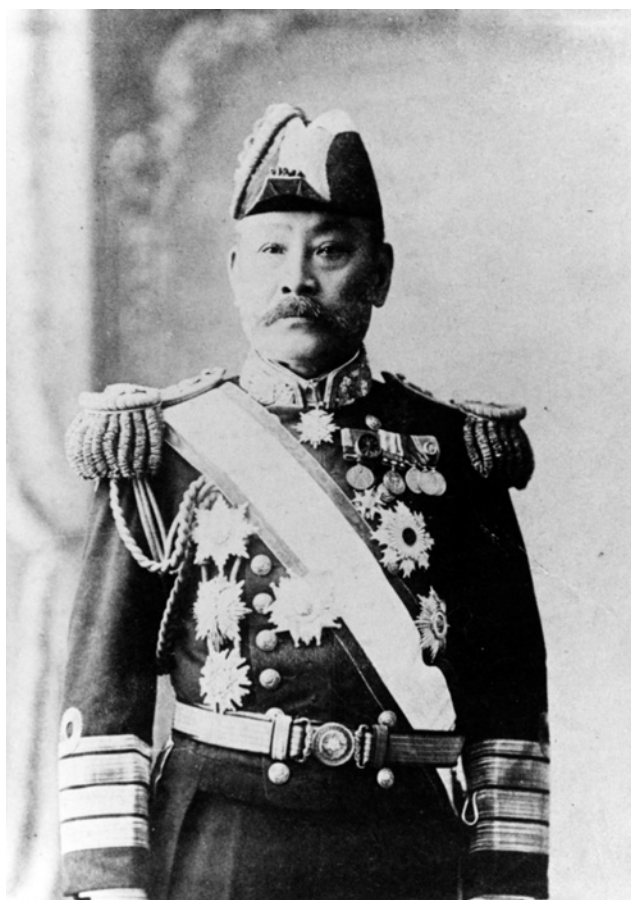
introduced universal education, in the early 1890s 27 per cent of the recruits were considered to be illiterate, with a further 33 per cent deemed to be semi-literate.

Another factor that allowed the IJN to fight more efficiently was the eradication of beriberi. Over-consumption of plain (white) rice resulting in a thiamine (vitamin B1) deficiency was to blame for the spread of the condition. In the IJN, plain rice was free, but meat, vegetables and condiments had to be purchased. Many poorer sailors tried to save money by eating only rice; also, brown rice was considered a low-class food, food for prisoners, and many sailors rejected having brown rice mixed in with their diet, claiming that this was an insult. Thanks to the actions of Professor Takaki Kanehiro, the IJN's surgeon-general, by 1894 the IJN was free from beriberi.

In 1894, the IJN numbered: 1,141 regular midshipmen plus 243 reservists; 270 regular chief petty officers plus 35 reservists; 1,702 regular petty officers plus 123 reservists; and 8,055 regular ratings plus 2,295 reservists. Most of the Japanese sailors who fought at the battle of the Yalu River were new to their ship; many were recalled reservists. Furthermore, the protected cruiser HIJMS *Hashidate* was newly commissioned (June 1894), and the crew had yet to experience a 'shakedown run' at sea. The protected cruiser HIJMS *Chiyoda* was also a new vessel, only commissioned in February 1894. With the IJN including so many new crews and ships, the choice of battle tactics available to Vice-Admiral Itō was limited; it was easiest to adopt a 'single file, follow the leader' approach.

Along with its modern weaponry, the IJN benefited from a very progressive personnel-management system. IJN officers were selected based on the depth of their general knowledge and previous experience of travelling aboard; to give officers a well-rounded military experience, postings were allocated according to a three-year cycle that alternated between ship and shore duties. Those who were considered to be rising stars undertook mandatory overseas education or at least service as naval attachés in one of the leading naval powers such as Britain or the United States.

Like the Chinese, the Japanese also sent their best and brightest overseas. In many cases, Japanese and Chinese personnel would share the same classroom, little knowing that they would one day face each other in battle. Ijuin Goro, who attended RNC Greenwich in 1882–83, was in the same class as Li Ding-xin and Chen Zhao-yi. Li Ding-xin was to serve as first officer of HICMS *Dingyuan*; Ijuin Goro became an aide to Commodore Yamamoto Gonbee and also served as staff officer in the Weapons and Mobilization Bureau of the IJN General Staff; and Chen Zhao-yi became the chief officer of HICMS *Weiyuan*. While the Chinese and Japanese officers enjoyed the same education, what made the difference was that the number of Japanese students sent overseas was vastly greater to that sent by the Chinese. In a letter to Viceroy Li Hong-zhang dated 1877, the Qing ambassador to the Court of St James, Guō Sōng-tāo, noted that there were more than 200 Japanese students in Britain, with 90 in London alone; all of the 20 Japanese students who Guō met were fluent in English. Moreover, many of the Japanese students were blue-blooded aristocrats, further tipping the balance. On their return to Japan, these well-connected bright minds were all given key positions within the IJN, thus giving them the power to implement key changes. By contrast, many of the Chinese students were the sons of ordinary merchants and office clerks, and had to languish in middle-level positions in the Beiyang Fleet for years while key policies affecting the Fleet remained in the hands of conservative mandarins who had never been out of China nor had the faintest idea about naval



warfare. Chinese hopes for expansion of their overseas scholarship scheme were dashed after Chinese students were banned from RNC Greenwich following Captain Lang's departure from China in 1890. For a time the Chinese hoped that the United States might cover this loss by accepting Chinese cadets to the United States Military Academy (West Point) and the United States Naval Academy (Annapolis), but these hopes were dashed when a wave of anti-Chinese sentiment swept the United States during the 1870s. While the Chinese were prevented from studying in Britain and the United States, Japanese cadets continue to travel to these important naval powers; starved of Western assistance, the Beiyang Fleet went into decline.

By 1894, most of the foreign naval experts had already left Japan. The fact that the Japanese had started their naval modernization before the Chinese gave the Japanese a major advantage in terms of a 'training gap'. Moreover, the quality of the foreign advisors employed by the Japanese was superior to that of the Chinese. For example, one of the few foreign advisors still serving in Japan in 1894 was the American Henry Walton Grinnell, a veteran who had seen combat in the American Civil War, while China's American advisor Philo Norton McGiffin had no real naval background, let alone combat experience. Grinnell's IJN service was at a very senior level, for he was employed as the IJN inspector-general as well as serving as an advisor to Vice-Admiral Itō, while the much younger McGiffin was relied upon to command a section of the Chinese fleet.

ABOVE RIGHT

Four Japanese officers who fought at the Yalu River are pictured here later in their careers. At top left is Vice-Admiral Hidaka Sōnojō, who served as captain of *Hashidate*; at top right is Vice-Admiral Kamimura Hikonojō, who commanded *Akitsushima*; at bottom left is Admiral Tōgō Heihachirō, commander of *Naniwa*; and at bottom right is Vice-Admiral Kabayama Sukenori, the IJN's chief-of-staff. [NH 121025 courtesy of the Naval History & Heritage Command]

COMBAT

THE BATTLE OF THE YALU RIVER

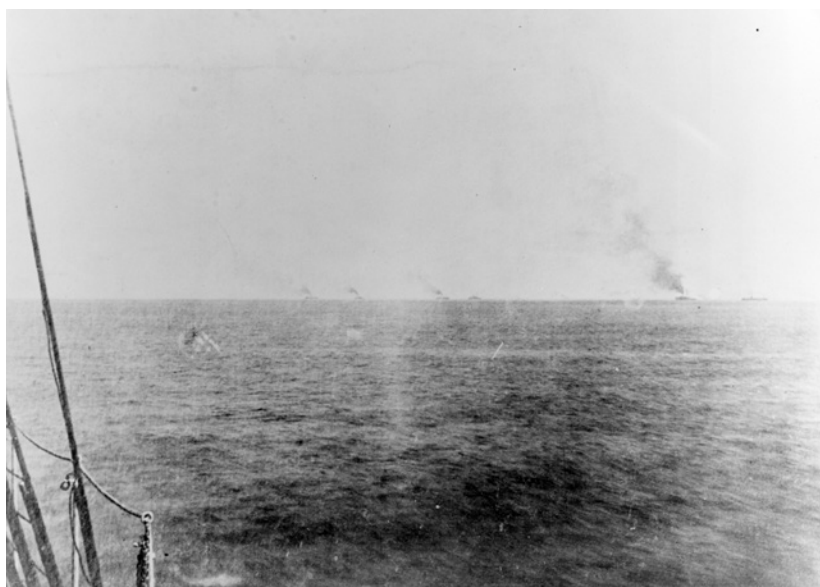
After the sinking of the transport ship *SS Kowshing* on 25 July 1894, the Chinese troops who had landed in Korea on 6 June were in desperate need of reinforcements. Two days later, the first of some 4,000 Japanese troops landed on the Korean Peninsula and subsequently chased the Chinese forces back to Pyongyang in early August, where they set about establishing defensive features. Pyongyang fell to the Japanese on 15 September; those Chinese who survived the assault either surrendered or retreated north-east to the coastal city of Uiju and north to the Yalu River. As 16 September dawned, an 18-vessel Chinese convoy under the command of Admiral Ding Ru-chang – *Dingyuan*, *Zhenyuan*, *Laiyuan*, *Jingyuan*, *Jiyuan*, *Pingyuan*, *Jingyuan* (CY), *Zhiyuan*, *Yangwei*, *Chaoyong*, *Guangjia*, *Guangbing*, *Zhenhong* and *Zhennan*, plus the torpedo boats *Fulong*, *Youer*, *Yousan* and *Zuoyi* – escorted six merchant vessels carrying over 4,000 troops and their equipment to reinforce the Chinese forces in Korea.

The outward journey of the Beiyang Fleet had begun on 12 September and was uneventful, and the convoy reached the landing zone by midday four days later. Six smaller vessels with shallower draft (*Zhenhong*, *Zhennan*, *Fulong*, *Youer*, *Yousan* and *Zuoyi*) guided the landing vessels 28km deep into the Yalu River and began disembarking during the afternoon of 16 September. The operation was not well planned, however, and a shortage of boats made the transfer of troops and equipment from ship to shore chaotic and slow. *Pingyuan* and *Guangbing* guarded the mouth of the river while the rest of the fleet acted as a security screen, 22km from the mouth of the river. The landing operation continued throughout the night. At 0430hrs on 17 September the Beiyang Fleet sounded reveille. Following breakfast, morning gun-drills and training continued

until midday on what was a fine cloudless day offering good visibility and calm seas.

At about 1050hrs on 17 September, observers aboard *Matsushima* saw smoke towards the north-east, and by 1140hrs, Vice-Admiral Itō was certain that it had to be the Beiyang Fleet, for he saw not one but many smoking stacks. Even so, it was not until 1200hrs that the Chinese spotted the approaching IJN fleet. Owing to the restriction of naval funds, the Chinese had to use lignite rather than high-

quality coal. Lignite gave off more smoke, and its low calorific value meant that more coal had to be burned to cover the same distance. By contrast, the Japanese were using Welsh coal – the best fuel money could buy.



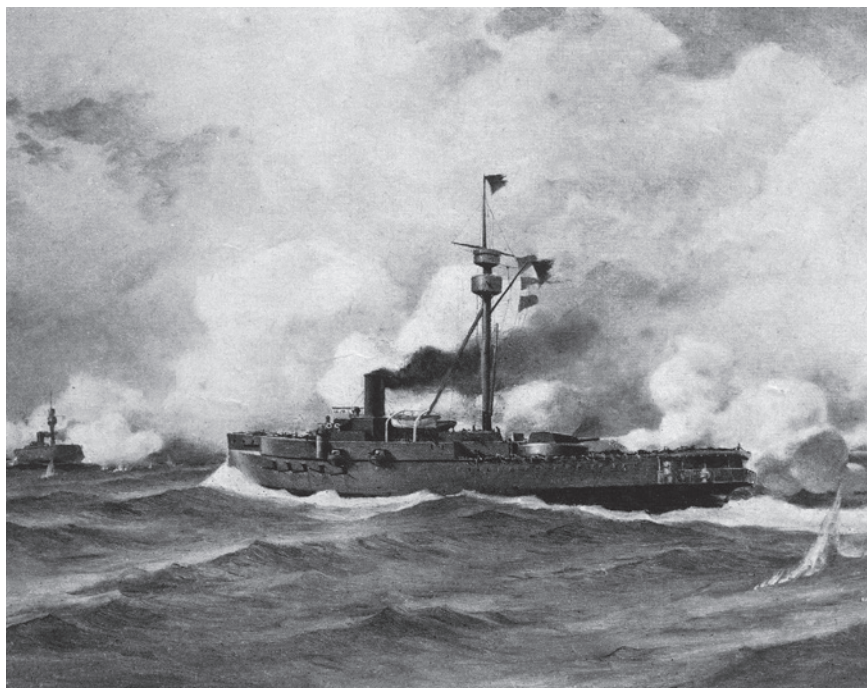
This grainy picture, taken from the Japanese armed merchantman *Saikyō Maru*, shows clearly the disposition of the Beiyang Fleet in line-abreast formation as it approached the Japanese fleet in the opening moves of the battle of the Yalu River. The day is clear, and the sea is calm. [NH 88888 courtesy of the Naval History & Heritage Command]

Chinese ships at the Yalu River and their commanders

Ship (Chinese name)	Ship's commander (Chinese name)
<i>Chaoyong</i> [超勇]	Captain Huang Jian-xun [黄建勋]
<i>Dingyuan</i> [定远]	Captain Liu Bu-chan [刘步蟾]
<i>Fulong</i> [福龙]	Captain Chai Ting-gan [蔡廷干]
<i>Guangbing</i> [广丙]	Captain Cheng Bi-guang [程璧光]
<i>Guangjia</i> [广甲]	Captain Wu Jing-rong [吴敬荣]
<i>Jingyuan</i> [经远]	Captain Lin Yong-sheng [林永升]
<i>Jingyuan</i> [CY] [靖远]	Captain Ye Zu-Gui Li [叶祖珪]
<i>Jiyuan</i> [济远]	Captain Fang Bo-qian [方伯谦]
<i>Laiyuan</i> [来远]	Captain Qiu Bao-ren [邱宝仁]
<i>Pingyuan</i> [平远]	Captain Li He [李和]
<i>Yangwei</i> [杨威]	Captain Lin Lü-zhong [林履中]
<i>Zhenyuan</i> [镇远]	Captain Lin Tai-zeng [林泰曾]
<i>Zhiyuan</i> [致远]	Captain Deng Shi-chang [邓世昌]
<i>Zuoyi</i> [左一]	Captain Wang Deng-yun [王登云]

Admiral Ding ordered action stations. His immediate concern was for the landing-force, for its ships were still in the process of departing the landing zone on the Yalu River. The Chinese fleet adopted a double line-ahead formation as it headed out to the open sea, while the Japanese were in a single line-ahead formation. The Chinese

In this illustration, *Matsushima* is steaming at full speed to engage with the Beiyang Fleet in the beginning of the battle of the Yalu River. Also visible is *Akitsushima*.
[DEA/A. DAGLI ORTI/Getty Images]



turned south-east towards the Japanese fleet in a wedge formation with *Dingyuan* and *Zhenyuan*, the two ironclads, at the apex of the wedge and the weaker and slower vessels on both wings – *Chaoyong* and *Yangwei* on the right wing and *Guangjia* and *Jiyuan* on the left wing. It is unclear whether this was the intended formation; one school of thought contends that Hanneken interfered with Admiral Ding's order, while another school of thought claims that it was a textbook manoeuvre practised by the Chinese all along.

Japanese ships at the Yalu River and their commanders	
Ship (Japanese name)	Ship's commander (Japanese name)
<i>Akagi</i> [赤城]	Captain Sakamoto Hachirōta [坂元八郎太]
<i>Akitsushima</i> [秋津洲]	Lieutenant-Commander Kamimura Hikonojō [上村彦之丞]
<i>Chiyoda</i> [千代田]	Captain Uchida Masatoshi [内田正敏]
<i>Fusō</i> [扶桑]	Captain Arai Arisura [新井有貫]
<i>Hashidate</i> [橋立]	Captain Hidaka Sōnojō [日高壯之丞]
<i>Hiei</i> [比叡]	Lieutenant-Commander Sakurai Kikunozo [櫻井規矩之左右]
<i>Itsukushima</i> [嚴島]	Captain Yokoo Michiaki [横尾道呈]
<i>Matsushima</i> [松島]	Captain Onomoto Tomomichi [榎本知道]
<i>Naniwa</i> [浪速]	Captain Tōgō Heihachirō [东乡平八郎]
<i>Saikyō Maru</i> [西京丸]	Lieutenant-Commander Kano Yunoshin [鹿野勇之進]
<i>Takachiho</i> [高千穂]	Captain Nomura Tadashi [野村貞]
<i>Yoshino</i> [吉野]	Captain Kawahara Yoichi [河原要一]

Japanese Flying Squadron

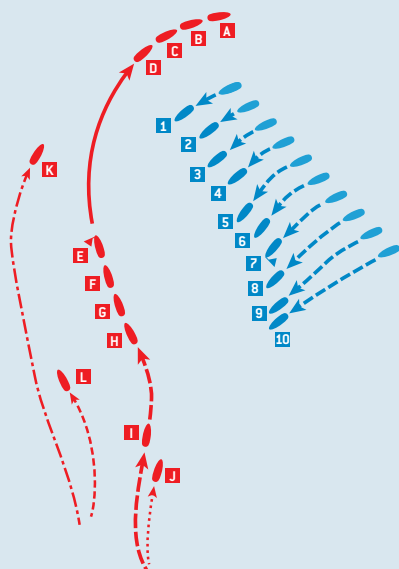
- A. *Yoshino*
- B. *Takachiho*
- C. *Akitsuushima*
- D. *Naniwa*

Japanese Main Squadron

- E. *Matsushima* (flagship)
- F. *Itsukushima*
- G. *Hashidate*
- H. *Chiyoda*
- I. *Fusō*
- J. *Hiei*
- K. *Saikyō Maru*
- L. *Akagi*

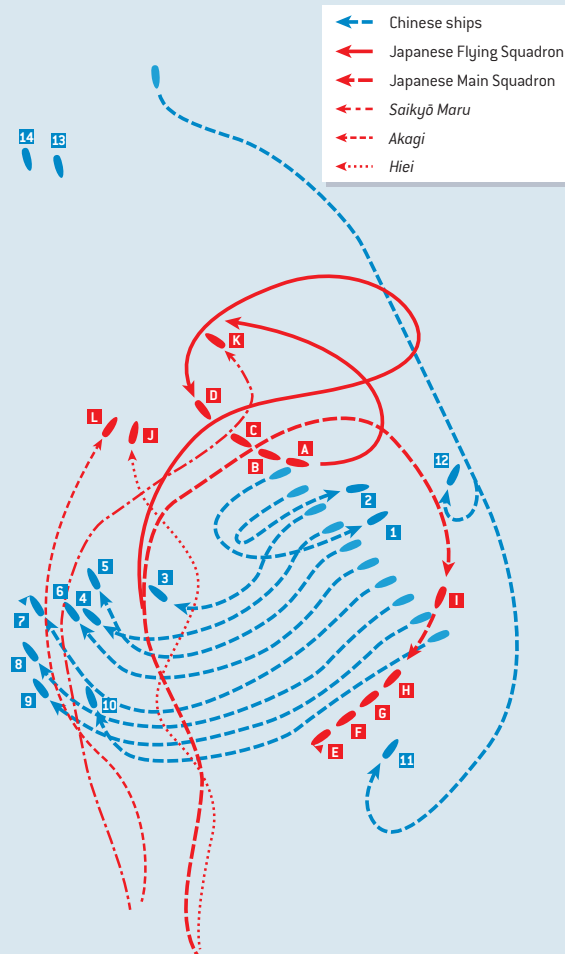
Chinese ships

- 1. *Yangwei*
- 2. *Chaoyong*
- 3. *Jingyuan* (CY)
- 4. *Jingyuan*
- 5. *Laiyuan*
- 6. *Zhenyuan*
- 7. *Dingyuan* (flagship)
- 8. *Zhiyuan*
- 9. *Guangjia*
- 10. *Jiyuan*
- 11. *Pingyuan*
- 12. *Guangbing*
- 13. *Fulong*
- 14. *Zuoyi*



Events: 1230–1300hrs (left)

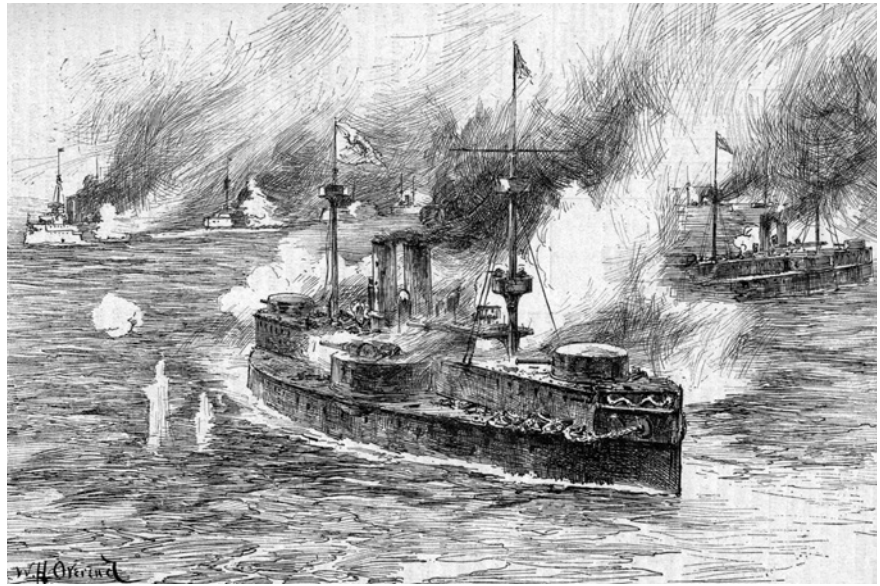
The Japanese approach in a line-ahead formation, meeting the Chinese who have just switched from a double line-ahead formation to a wedge/extended-line formation. The Japanese split into two squadrons; the faster Flying Squadron begins to flank the Chinese right wing. As the Flying Squadron closes in it hits the two weaker Chinese ships on that side, *Yangwei* and *Chaoyong*, with devastating fire. *Hiei* (J) breaks off and heads straight towards the Chinese line. Being weaker and slower than the rest of the Japanese force, the gunboat *Akagi* (L) and the armed merchantman *Saikyō Maru* (K) try to stay away from the fight, but their weakness is noticed and the Chinese hit them hard, killing *Akagi*'s captain.



Events: 1300–1500hrs (right)

The Flying Squadron spots four Chinese ships – *Pingyuan* (11), *Guangbing* (12), *Fulong* (13) and *Zuoyi* (14) – and turns back to hit the main Chinese fleet from the rear. *Yangwei* (1) and *Chaoyong* (2), both in flames, try to escape from the battle, but by breaking ranks, they expose the Chinese centre. *Hiei* (J) barely survives its charge but has managed to break up the integrity of the Chinese formation. Being slower ships, both *Saikyō Maru* (K) and *Akagi* (L) are badly hit when they cross the Chinese front. Having circled around the Chinese from the rear the IJN Main Squadron hits the Chinese on their left. As *Pingyuan* and *Guangbing* move to the south-east, *Pingyuan* is diverted in a bid to help the burning *Chaoyong* (2). *Pingyuan* hits the Japanese flagship, *Matsushima* (E), narrowly missing the Japanese ship's magazine.

This depiction of the battle of the Yalu River by William Heysham Overend (1851–98) was published in 1902. This drawing shows *Dingyuan* (foreground centre) and *Zhenyuan* (foreground right) in action against (from left to right) *Yoshino*, *Takachiho*, *Akitsuishima*, *Naniwa*, *Chiyoda* and *Hashidate*. Note the Dragon Flag – the Chinese national flag at this time – on the rear mast. Prior to the 1870s the Chinese nation had no flag and it was because of establishing a modern navy that the Emperor Meiji reluctantly approved the creation of a 'national flag'. (The Print Collector/Getty Images)



At a distance of about 5,700m, *Dingyuan* fired from its starboard main-gun turret, aiming at *Yoshino*, but overshot by 100m, according to McGiffin's subsequent account. Although in theory *Dingyuan*'s main guns could – if fired using the maximum charge and at the maximum 13° angle of elevation – reach 7,260m, with a flight time of 20 seconds to target, it would be almost impossible to score a hit. At 5,700m the flight time to target was 15 seconds, making a hit similarly unlikely. By now, the Japanese fleet had split from one single-file formation into two squadrons, with *Matsushima* acting as flagship leading the slower Main Squadron – *Itsukushima*, *Hashidate*, *Chiyoda*, *Fusō* and *Hiei* – under the command of Vice-Admiral Itō. The faster squadron, known as the Flying Squadron and composed of the cruisers *Yoshino*, *Takachiho*, *Akitsuishima* and *Naniwa*, was under the command of Rear-Admiral Tsuboi. There were also two dispatch vessels, the armed merchantman *Saikyō Maru* and the gunboat *Akagi*, following the Main Squadron at a distance. On board *Saikyō Maru* was the IJN's chief-of-staff, Vice-Admiral Kabayama Sukenori, and five of his staff as observers.

The Japanese were in a perfect position, for they were crossing the Chinese 'T'. The Flying Squadron was leading, followed by the Main Squadron. Itō ordered the Flying Squadron to flank the Chinese right wing. Tsuboi increased the Flying Squadron's speed from 8kn to 14kn, moving to the north of the Chinese formation and aiming at two of the slowest and weakest vessels, *Yangwei* and *Chaoyang*. At 3,000m, the Japanese fired their first shot of the battle. The Flying Squadron then moved northwards, piercing the centre of the Chinese wedge, which had by now become more of a line-ahead formation from the rear.

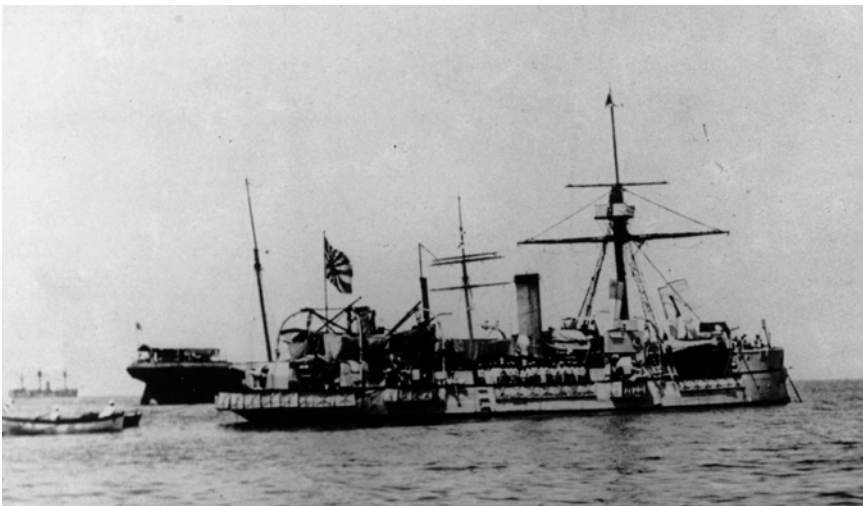
Dingyuan and *Zhenyuan* were the IJN's chosen targets; several rounds hit *Dingyuan*'s flying bridge and damaged the signal mast, and Ding was severely wounded. This proved to be a double disaster; with the commander incapacitated and the ability to give flag signals lost, *Dingyuan* could no longer act as the Chinese flagship. Hanneken was now de facto commander of *Dingyuan*. *Zhenyuan* was also hit and McGiffin was wounded.

Even so, the Chinese also scored some successes, hitting both *Takachiho* and *Akitsushima* on the starboard side. *Naniwa* was holed near the waterline. At 1304hrs, *Dingyuan* scored a hit on *Matsushima*, knocking out a gun and killing one signalman and wounding three sailors. *Hiei*, now lagging behind *Fusō* by as much as 1,000m, was targeted by *Jingyuan* (CY) and *Dingyuan*. Closing to 700m as it tried to pass through the Chinese line, *Hiei* was hit several times on the starboard side, claiming four lives. Aboard *Jingyuan* (CY), marines armed with rifles and cutlasses were getting ready to board the beleaguered *Hiei*, but the ironclad corvette's QF guns blasted out over 1,500 rounds in 2 minutes, thus preventing boarding. In the midst of the chaos, *Hiei*, positioned aft of *Matsushima*, was hit on the starboard quarter by *Dingyuan*'s massive main gun, killing 19 Japanese crewmen including both *Hiei*'s doctors. At 1355hrs *Hiei* was still afloat, though smoke filled most of the cabins. Having managed to escape the fire of *Laiyuan*, the Japanese ship then retired from the battle, heading east.

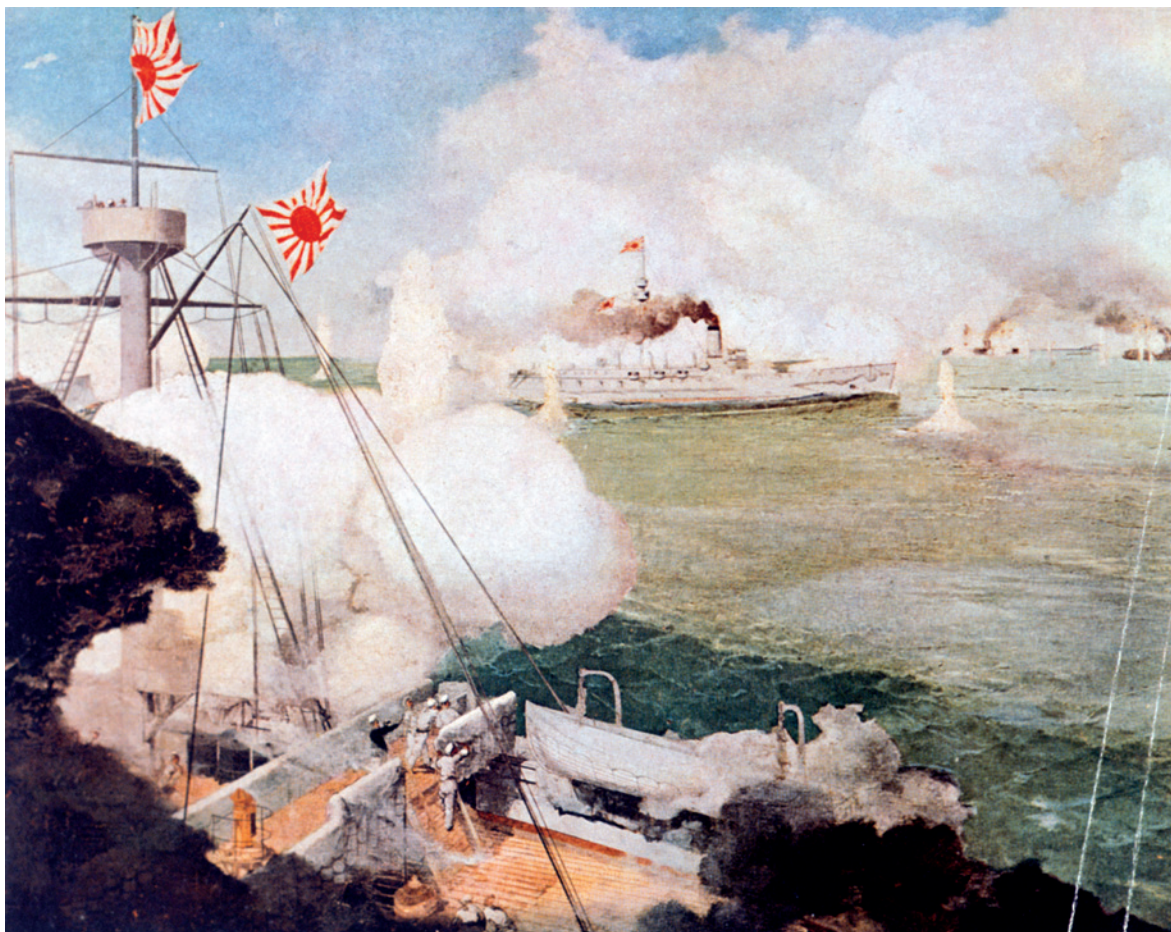
During this engagement, the gunboat *Akagi* was loitering behind the port quarter of *Hiei*, and when the latter vessel turned hard to starboard to avoid a collision, *Akagi* was exposed to *Dingyuan*'s aft 150mm chase gun. A shot from *Dingyuan* not only destroyed *Akagi*'s 47mm QF guns but killed the gunboat's skipper, Captain Sakamoto Hachirōta. (According to Japanese accounts, the shot that killed Sakamoto was from *Laiyuan* at 1325hrs.) *Akagi*'s executive officer, Lieutenant Sato Tetsutaro, took over command, but the Japanese gunboat was hit again; this time, 28 men were killed. *Akagi* returned fire, damaging *Laiyuan*'s aft area and starting a large fire. This damage to *Laiyuan* saved *Akagi*, allowing the gunboat to retire from the battle at 1430hrs.

At 1308hrs, *Chaoyong* landed a hit on *Yoshino*'s deck, killing two and wounding nine, but 2 minutes later, *Chaoyong* burst into flames and sank. *Yangwei* was heavily damaged and tried to escape towards Dalu Island to the north-east, but hit some rocks as a result of damage to the ship's steering.

The armed merchantman *Saikyō Maru* did not escape the attention of the Chinese. The ship was hit early on in the battle, mainly on the port side, but as it turned with the Main Squadron, it became exposed to the main guns of the two Chinese ironclads. *Saikyō Maru* was hit several times by the Chinese QF guns, the impacts cutting several



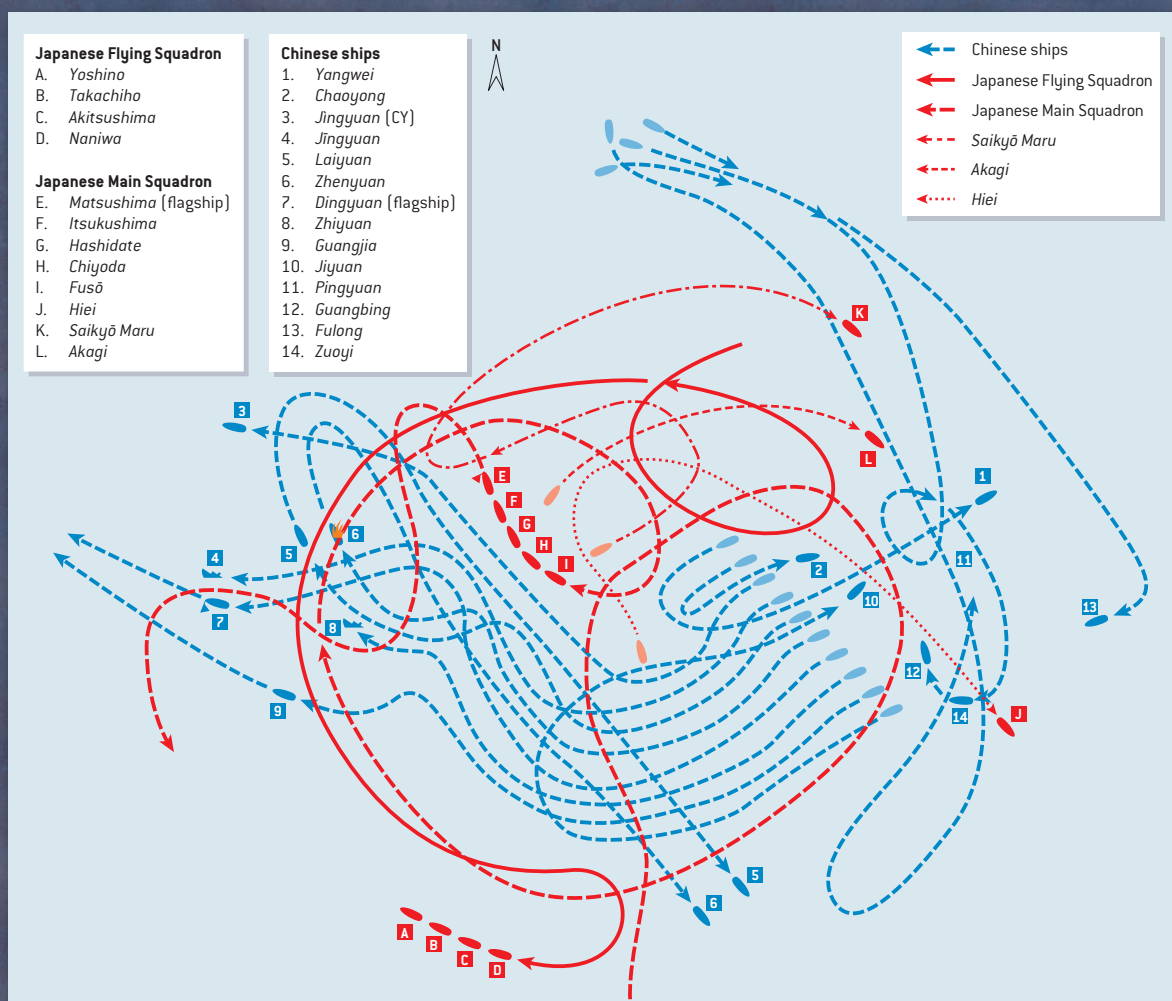
Well-armed for its size, *Akagi* was a 600-ton Japanese gunboat with a hull made of steel rather than iron or composite materials. In 1894, *Akagi* was upgraded to carry four 120mm/40 QF guns on the ship's centreline and six 47mm QF guns, all protected by gun shields. [NH 88887 courtesy of the Naval History & Heritage Command]



A depiction of *Akagi*, with *Hashidate* or *Itsukushima* in the background. *Akagi*'s original mission was to protect *Saikyō Maru*, carrying Vice-Admiral Kabayama, but *Akagi* was hit by *Laiyuan*, killing the captain, Sakamoto Hachirōta.
[DEA/G. NIMATALLAH/ Getty Images]

steam pipes and damaging key instruments. Furthermore, the Japanese ship was hit on the starboard side near the waterline and began taking on water. Seizing the chance to finish off the armed merchantman, at about 1455hrs, the Chinese torpedo boat *Fulong* closed to 400m and let loose a torpedo, but missed. *Fulong* made another attempt, this time from the port side, but the second torpedo passed under *Saikyō Maru*. Torpedoes launched above the waterline tended to sink to a greater depth before floating up to reach the normal running depth; by rapidly closing on the torpedo boat, the captain of *Saikyō Maru*, Lieutenant-Commander Kano Yunoshin, managed to dodge the torpedo although everyone aboard the ship was expecting a certain hit. *Saikyō Maru* quietly slipped away from the battle, barely making it back to Japan.

Just after 1500hrs, *Dingyuan* was hit on the hull, resulting in a huge fire. Seeing the flagship in trouble, *Zhenyuan* and *Zhiyuan* closed in to help with firefighting and protect *Dingyuan* from the Japanese Flying Squadron. By this time, *Zhiyuan* was running short of ammunition; seeing *Yoshino* closing in for the kill, the captain of *Zhiyuan*, Deng Shi-chang, decided that the only course of action was to ram *Yoshino*. In response, *Yoshino* fired all of its QF guns; one lucky shot hit the Chinese torpedo boat, igniting a torpedo and causing a huge explosion. *Zhiyuan* soon began listing, and



Events: 1500hrs–1530hrs

Finally moving to the east, the Chinese torpedo boats *Fulong* (13) and *Zuoyi* (14) try to hit the two badly damaged Japanese ships *Saikyō Maru* (K) and *Akagi* (L) as they attempt to follow *Hiei* (J) to escape to the east. *Zuoyi* breaks ranks to join *Guangbing* (12), however, leaving only *Fulong* to ambush the fleeing Japanese. The torpedo boats' sudden appearance to the east prompts the Japanese Flying Squadron to double back and turn to hit the now scattered Chinese main fleet. The Flying Squadron succeeds in sinking *Jingyuan* (4) and *Zhiyuan* (8), sets *Zhenyuan*

(6) on fire and forces *Guangjia* (9) to flee the scene. The crew of *Jiyuan* (10) loses the will to fight; in the ship's mad dash to escape it collides with the badly damaged *Yangwei* (1) as the cruiser moves to the north-east until running aground at Dalu Island.

The Japanese have literally run rings round the Chinese, hitting them on all sides, like peeling an onion, layer by layer until the two ironclads at its core are left exposed. The battle continues for another two hours before the failing light and a lack of ammunition prompt both sides to retire.

Published in 1902, this work by William Heysham Overend depicts an explosion aboard *Matsushima* at about 1530hrs. This was caused by a hit from *Dingyuan*'s main guns on *Matsushima*'s lower deck, igniting a series of explosions that disabled the Japanese ship's main gun by damaging the ammunition hoist. [The Print Collector/Getty Images]



according to McGiffin, sank at 1520hrs with Deng aboard. Only seven from the crew of 202 survived the sinking.

By 1530hrs, *Zhiyuan* had sunk, and – controversially – *Jiyuan* had been witnessed leaving the battle, followed by *Guangjia*. *Jiyuan*'s captain, Fang Bo-qian, signalled that his ship was 'heavily damaged'; Fang was subsequently charged with 'cowardice in the face of the enemy' and executed. In recent years, however, there has been a movement to rehabilitate him – the argument is that the guns on his vessel were all out of action, meaning he was unable to fight. In the midst of its escape, *Jiyuan* collided with the badly damaged *Yangwei*; *Guangjia* got lost and ran aground on the Chinese coast, and was only discovered six days later by *Akitsu* and *Naniwa*. To escape the humiliation of capture, Captain Wu Jing-rong scuttled *Guangjia*.

Around the same time that *Jiyuan* departed the battle, *Pingyuan*, *Guangbing*, *Fulong* and *Zuoyi*, the four smaller, shallow-draught boats which had thus far been protecting the Chinese landing on the Yalu River, suddenly appeared in the battle. At 2,200m, *Pingyuan* scored a lucky hit on *Matsushima* as the Japanese ship suddenly turned towards the Chinese vessel. *Matsushima* was hit amidships, wrecking the cruiser's side torpedo tubes and killing four sailors. *Matsushima* retaliated, scoring a hit on *Pingyuan*'s 260mm forward main gun and starting a fire. Fearing the fire would consume his ship, Captain Li He immediately turned *Pingyuan* south and retired from the battle. To protect the flaming ship, Captain Cheng Bi-guang of *Guangbing* temporarily left the battle with *Pingyuan*.

By this time six Chinese ships – 43 per cent of the fleet – were out of the battle while three Japanese ships – 25 per cent of the Japanese force – had retired from the fight. The fleets were closely matched: eight Chinese ships faced nine Japanese ships. Even so, the Chinese left wing was exposed after *Jiyuan* and *Guangjia* left the battle prematurely. *Jingyuan* soon found itself isolated and cornered by the Japanese. It was four against one; the ships of the IJN's Flying Squadron pounded *Jingyuan*, killing most of the Chinese ship's officers, including her captain, Lin Yong-sheng. *Jingyuan* soon sank, with only 16 survivors.

With the Chinese now down to seven ships, the situation evolved very quickly. The Japanese now resolved to 'divide and conquer'. The Main Squadron – *Matsushima*, *Chiyoda*, *Itsukushima*, *Hashidate* and *Fusō* – concentrated on sinking the two Chinese ironclads, while the Flying Squadron – *Yoshino*, *Naniwa*, *Akitsushima* and *Takachiho* – targeted the remaining Chinese cruisers *Jingyuan* (CY) and *Laiyuan*. *Laiyuan* was hit more than 200 times, starting a huge fire that consumed most of the aft decking; the only working gun remaining was the forward gun. *Jingyuan* (CY) was hit over 100 times, critically with a few rounds at the waterline. The captain of *Jingyuan* (CY), Ye Zu-gui, immediately hoisted the signal: 'Steer West'. Both cruisers departed toward Dalu Island; using the advantage of their shallower draught, they took shelter in the shallow waters. Fearing grounding, the Japanese ships did not dare approach the Chinese cruisers. While the Chinese crews battled to save the two cruisers, those Chinese guns that remained in use were still firing at the Japanese ships.

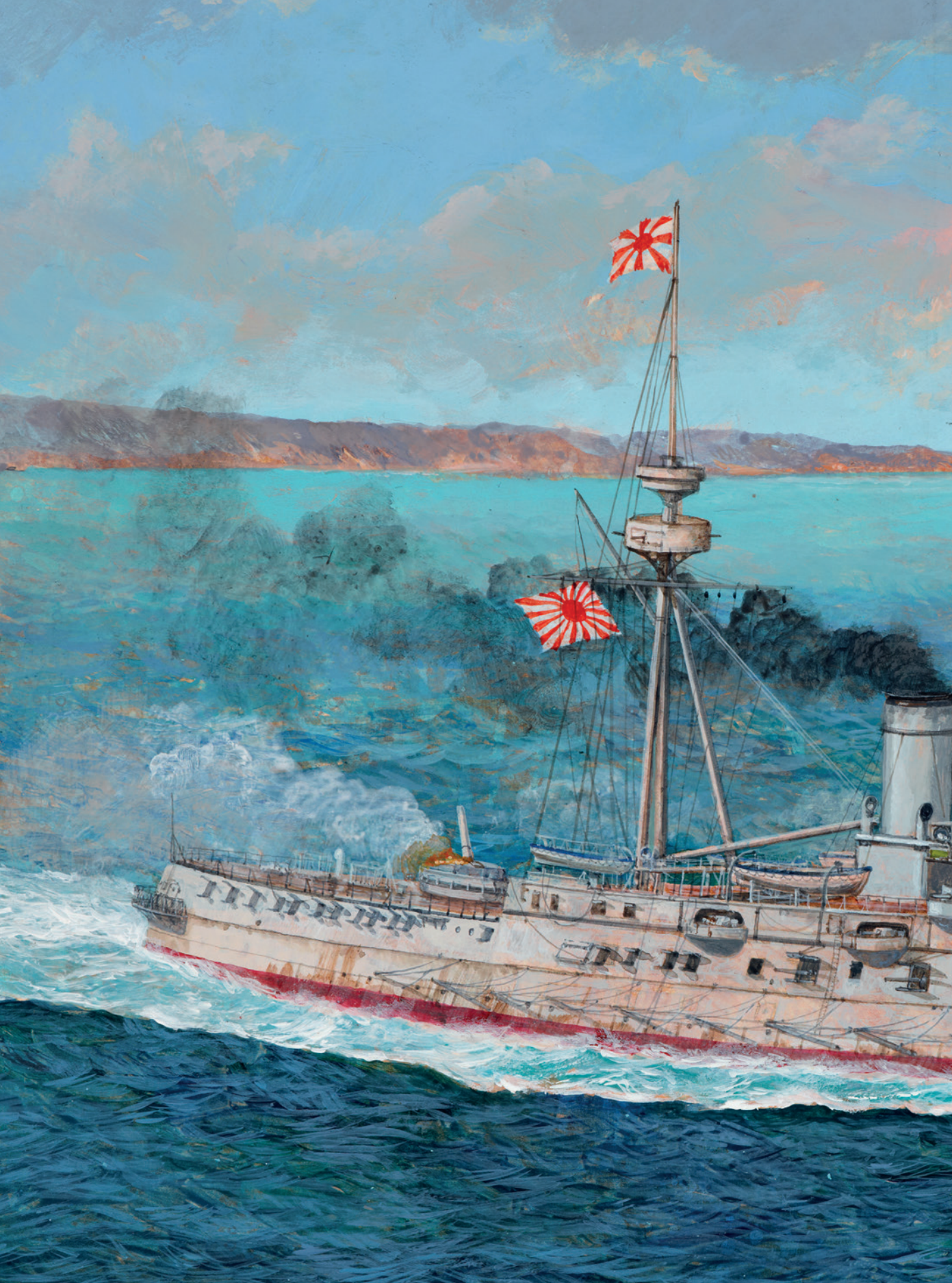
Dingyuan and *Zhenyuan* were isolated; it was two against five. Despite striking both Chinese vessels with hundred of shots, the Japanese ships did not sink them. The Chinese crews' firefighting drills were superb; this was acknowledged by the Japanese in their war diaries. The fires were put out, saving both Chinese ships. In the midst of battle, a Japanese sailor claimed that he saw a Chinese officer coolly taking photographs of the scene. By this time, Liu Bu-chan, the captain of *Dingyuan*, and most of the crew were also wounded. Lieutenant William Ferdinand Tyler RNR, 2IC on *Dingyuan*, praised the crews of *Dingyuan* and *Zhenyuan* for their courage and steadfastness in the face of great danger (Tyler 1929).

Even at this point, however, the final outcome of the battle remained uncertain. At about 1530hrs, one of *Dingyuan*'s massive guns landed a shot on *Matsushima*'s lower deck, knocking out the Japanese ship's No. 4 120mm QF gun on the starboard side and igniting a series of deck explosions; these killed 84 men, including Lieutenant Shima Kiyonao and Ensign Itō Makaki, both of whom were gun commanders on the lower deck. Although the fire was extinguished 40 minutes later, by 1610hrs *Matsushima* had lost all of its port-side guns; the hoist to the main gun was also destroyed, putting the ship's main gun out of action.

Realizing that the Japanese flagship had essentially lost its combat ability, Captain Onomoto Tomomichi signalled that 'Each ship is free to go as they please'. *Matsushima* and the rest of the surviving Japanese ships attempted to head south-east, but the Chinese ships, especially the two ironclads, still had plenty of fight left in them. The Chinese gave chase; closing to within 3–6km, they began pounding the Japanese fleet again. In this engagement, *Zhenyuan* shot all its remaining 48 rounds from its two 150mm chase guns, leaving only 25 rounds for the ship's 305mm main guns. All

OVERLEAF

This plate depicts the moment when *Matsushima*, leading the Japanese Main Squadron in a line-ahead formation travelling south-west, encountered the solitary protected gunboat *Pingyuan*, moving to the north-east on an opposite but parallel track. Despite being hit with gunfire that caused a mighty blaze just behind the stack, *Pingyuan* continued to close to about 1,200m and managed to score a hit with its 260mm RBL forward main gun, firing a solid-shot penetrator round that hit *Matsushima* about amidships. The round hit the Japanese ship at an oblique angle, penetrating through the officers' wardroom and killing a dozen or so men; it destroyed the hydraulic system of the main gun, thus rendering the 320mm Canet gun useless for the rest of the battle. Moments later, however, the Japanese landed a shot on *Pingyuan*'s main gun, but the Chinese ship's QF guns were scoring hits on *Matsushima*, destroying the signal mast. In the brief encounter, *Matsushima* was hit 13 times and 35 crewmen were killed. As *Pingyuan* passed along the Japanese Main Squadron, the Chinese ship engaged *Itsukushima* and *Hashidate*, both of which were following behind *Matsushima*. Despite being outgunned, *Pingyuan* scored hits on both cruisers; but with four ships (including *Chiyoda*) now attacking *Pingyuan*, the Chinese ship was hit several times and was forced to flee the battle at 1616hrs.





Zhenyuan's explosive shells were expended. By about 1700hrs, *Jingyuan* (CY) and *Laiyuan*, the two cruisers that had been sheltering at Dalu Island, had done enough to stop the flooding that resulted from the earlier damage sustained, and all of the fires had been extinguished; they rejoined the battle. On the advice of his first lieutenant, Liu Guan-xiong, Captain Ye Zu-gui raised the signal 'Rest of the fleet join us to attack the enemy's flank' and rallied the remaining Chinese vessels – *Laiyuan*, *Pingyuan* and *Guangbing*, plus the torpedo boats *Fulong* and *Zuoyi* – to battle. (The torpedo boats *Youer* and *Yousan* and the gunboats *Zhennan* and *Zhenzhong* were held up in the Yalu River protecting the Chinese Army forces, and were unlikely to be available until the morning of 18 September.)

By 1720hrs the sun was setting and Vice-Admiral Itō sensed that it was time to bring the combat to a close, not only on account of the failing light but also because the Chinese had called in their reserves; he was worried that the torpedo boats could cause much havoc, especially in the dark. At 1730hrs, Itō raised the signal 'Cease all combat'. The Main Squadron steamed off south without waiting for the Flying Squadron to join up. By 1915hrs, Itō saw that the Beiyang Fleet had stopped pursuing the Japanese. Feeling more relaxed, at 1930hrs Itō transferred his flag from the badly damaged *Matsushima* to *Hashidate*; *Matsushima* was ordered to proceed to Sasebo for urgent repairs. The rest of the Japanese fleet was to follow in a single-file formation and proceeded eastwards.

Seeing the Japanese fleet heading east, Admiral Ding was concerned, for he knew that the Chinese Army landing force had not yet finished unloading its equipment. He ordered what was left of the Beiyang Fleet to proceed back to the mouth of the Yalu River. After giving chase for a short time, Ding saw that the Japanese were not heading for the landing zone, but just in case he ordered the torpedo boats *Youer* and *Yousan* to protect the landing force while he and the rest of the fleet returned to Lüshunkou. In just over five hours' time, the once-mighty Beiyang Fleet would be devastated.

THE BATTLE OF WEIHAIWEI

After the Chinese defeat at the Yalu River, the survivors of the Beiyang Fleet headed to Lüshunkou. The defeat of the Beiyang Fleet was a surprise to the Japanese as well as being a shock to the Chinese; the IJN had expected an even fight, but never a Japanese victory on this scale. Owing to the level of damage sustained by the Chinese ships in the battle, getting them back to sea would take some time. The Chinese were astonished when, in a meeting with Vice-Admiral Sir Edmund Fremantle, the Royal Navy's commander-in-chief in China, Viceroy Li was told that the majority of the Japanese ships were back at sea after only three days in port (*Matsushima* was in dry dock for 26 days). Moreover, the Japanese ships that were reported sunk were in fact still afloat. In the mean time, the Chinese Army in Korea had lost the will to fight and collapsed in the face of the Japanese, sometimes abandoning forts without firing a shot. By 25 October, the IJA had crossed the Yalu River and took the war into Chinese Manchuria.



On Hanneken's advice, Admiral Ding took the Beiyang Fleet to Weihaiwei, on the other side of the gulf that is known today as Dalian Bay. The gulf is shaped like a letter 'C'; Lüshunkou commands the northern entrance of the bay, and Weihaiwei the southern promontory of the mouth of the gulf. Lüshunkou was heavily defended by the Chinese; all avenues of approach were covered by guns, many of the gun positions being Hanneken's handiwork. The port had plenty of food and ammunition, and it would require some effort on the part of the Japanese before it fell into their hands. Besides its strong defences, Lüshunkou offered the only dry-dock facilities available to the Beiyang Fleet. On 24 October, the Chinese received news that the Japanese had landed on the Chinese mainland, just north-east of Lüshunkou. Despite the Japanese landings taking an incredible 15 days to complete, the Chinese failed to take the opportunity to attack when the Japanese were at their most vulnerable. As the Japanese ground force marched on Lüshunkou, the Chinese garrison commanders abandoned their positions, and the port fell to the Japanese on 21 November.

This photograph depicts the landing of Japanese troops on the Shandong promontory near Weihaiwei in January 1895. [ullstein bild/ullstein bild via Getty Images]

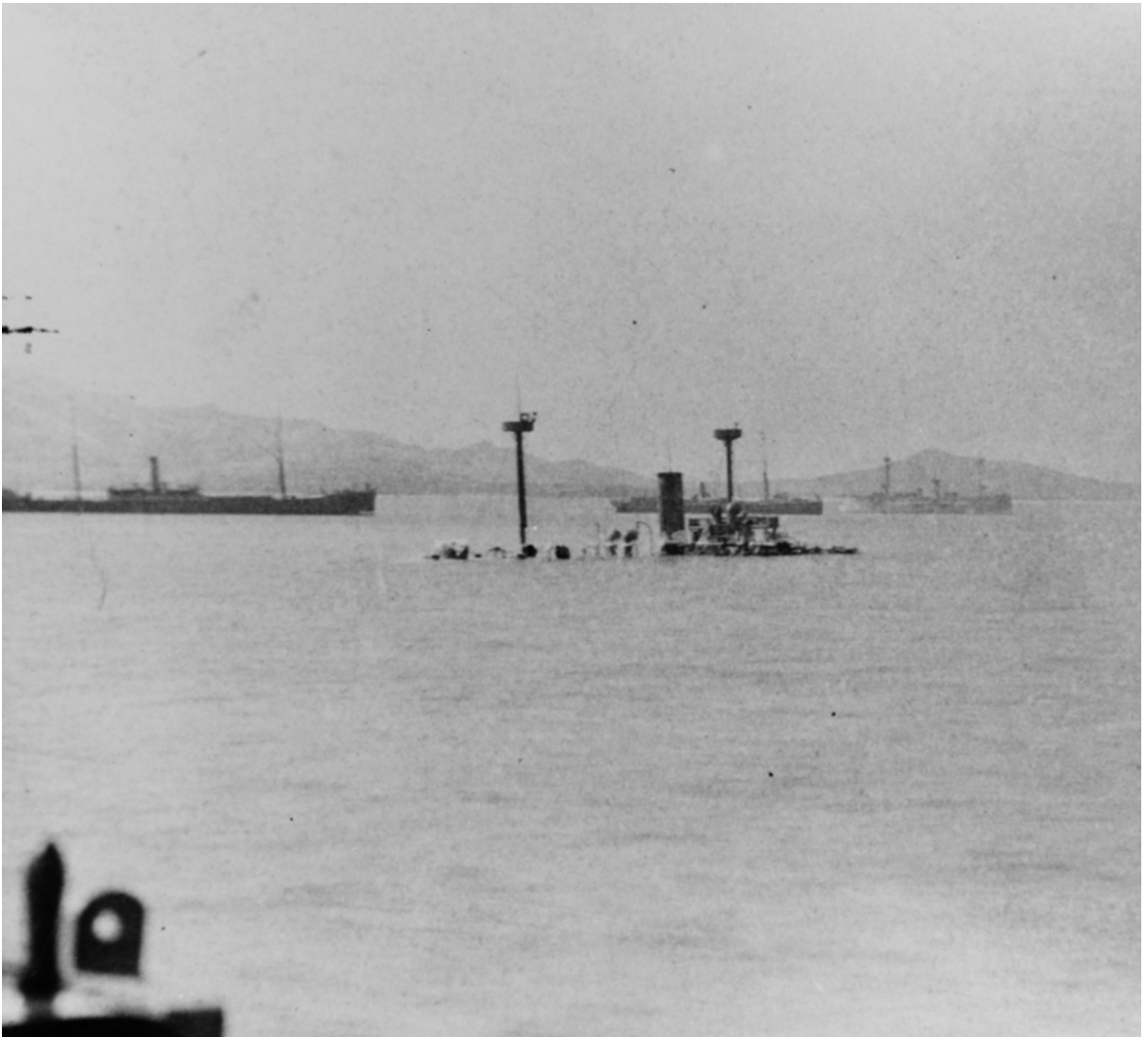
After the loss of Lüshunkou, the Beiyang Fleet withdrew to Weihaiwei. Ding and the Army commander, Dai Zhong-qian, could not agree on how to defend Weihaiwei, or even who was responsible for what. Viceroy Li and Ding were under extreme pressure and punishment loomed; but although Li was demoted, he had to carry on with the job as there was no suitable replacement.

While the Chinese argued among themselves, the Japanese were preparing to finish off the Beiyang Fleet. On 11 January 1895, the IJN's Combined Fleet landed elements of the IJA's II Corps just south of Weihaiwei. After consolidating and reorganizing, the Japanese ground force departed for Weihaiwei on 26 January. The Japanese attack had been planned to coincide with the Chinese New Year, and the invaders encountered no resistance as they converged on Weihaiwei on 29 January, but the severe winter cold, with temperature as low as -26°C , and blizzard conditions hampered the attack. On 1 February the southern fort fell, followed by the northern fort; General Dai committed suicide. Japanese troops entered the town of Weihaiwei on 2 February without opposition, as its garrison had fled the night before.

With the guns of the Chinese shore batteries now in Japanese hands, the IJA began shelling the Beiyang Fleet, moored in the anchorage. On 4 February, the Japanese managed to remove the boom protecting the anchorage, allowing access to the IJN's torpedo boats, which made repeated night attacks on the Chinese ships. On 5 February, *Dingyuan* ran aground after trying to outrun torpedoes; *Zhenyuan* was further damaged, rendering the ship immobile. On 7 February, a combined Japanese fleet attacked, severely damaging *Dingyuan* and *Jingyuan* (CY) and sinking *Laiyuan*, the elderly ironclad *Weiyan* and the auxiliary tug *Pao Hua*. The crews of the remaining Chinese torpedo boats mutinied and attempted to escape towards Yantai, but six of the boats were destroyed, and the Japanese captured the remaining seven. On 9 February, *Jingyuan* (CY) was hit by fire from the 204mm guns of the captured Lujiao

This Japanese woodcut depicts the battle of Weihaiwei. The great victory over China was widely celebrated in Japan and the public demand for 'news' drove many entrepreneurs to produce such prints. Many lacked historical accuracy and depicted the Chinese displaying cowardice and incompetence while the Japanese were shown as clean-cut, well-dressed heroes. (Library of Congress/Corbis/VCG via Getty Images)





(Deer Antler) Battery in southern Weihaiwei, rendering the ship incapable of further action; Ding ordered it to be scuttled.

Despite Itō's direct appeal to Ding to accept political asylum in Japan until the end of the war, and then return to his native land to aid China in setting her policy on a sound basis, Ding refused the offer, citing his honour as an officer of the Beiyang Fleet. Taking responsibility for the defeat, Ding committed suicide by overdosing on opium; his deputy, Admiral Liu Bu-chan, followed suit after ordering that his warship, *Dingyuan*, be scuttled by explosives. The remaining ships of the Beiyang Fleet – *Zhenyuan*, *Jiyuan*, *Pingyuan*, *Guangbing*, *Zhendong*, *Zhenxi*, *Zhennan*, *Zhenbei*, *Zhenzhong* and *Zhenbian* – were taken over and renovated by the IJN.

After the destruction of the Beiyang Fleet in Weihaiwei, the Admiralty Board in Beijing was abolished, for China no longer had a navy. The battle of Weihaiwei is regarded as the last major battle of the First Sino-Japanese War because shortly thereafter, China entered into peace negotiations in earnest with Japan.

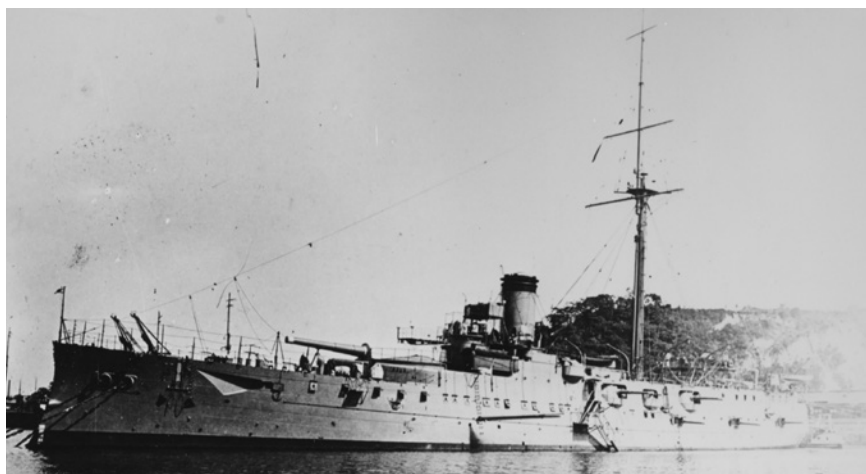
Jingyuan (CY) suffered a fatal blow after being repeatedly hit by the massive 204mm guns from the Lujiao (Deer Antler) Battery in southern Weihaiwei after the battery fell into Japanese hands. Unable to be taken under tow, the ship was blown up by crewmen from the gunboat *Guangbing*. (NH 70198 courtesy of the Naval History & Heritage Command)

STATISTICS AND ANALYSIS

CASUALTIES

The scale of the Japanese victory in the battle of the Yalu River is starkly illustrated by the scale of losses on both sides. The Japanese sank five Chinese warships, severely damaged three more and killed or wounded 738 Chinese sailors. In a potent demonstration of the effectiveness of its composite armour, despite being hit 159

Hashidate following its 1902 refit. *Hashidate* became the first Japanese warship to have the large Miyabara watertube boilers – a total of eight were fitted. In speed trials on 20 October 1902, she was able to attain a new top speed of 16kn. Also during this overhaul, the ship's secondary armament was replaced by two 76mm guns and 18 47mm Hotchkiss QF guns. [NH 101776 courtesy of the Naval History & Heritage Command]



Chinese casualties at the Yalu River		
Ship	Killed	Wounded
<i>Chaoyong</i>	122	–
<i>Dingyuan</i>	17	38
<i>Fulong</i>	–	–
<i>Guangbing</i>	–	3
<i>Guangjia</i>	–	–
<i>Jingyuan</i>	184	–
<i>Jingyuan (CY)</i>	2	16
<i>Jiyuan</i>	5	10
<i>Laiyuan</i>	17	13
<i>Pingyuan</i>	–	15 (2*)
<i>Yangwei</i>	57	–
<i>Zhenyuan</i>	13	28 (2)
<i>Zhiyuan</i>	198	–
Total	615	123 (4)
* Numbers in parentheses indicate sailors who later died of their wounds		

times, *Dingyuan* suffered only 17 dead and 38 wounded; *Zhenyuan* was hit no fewer than 220 times, suffering 13 dead and 28 wounded.

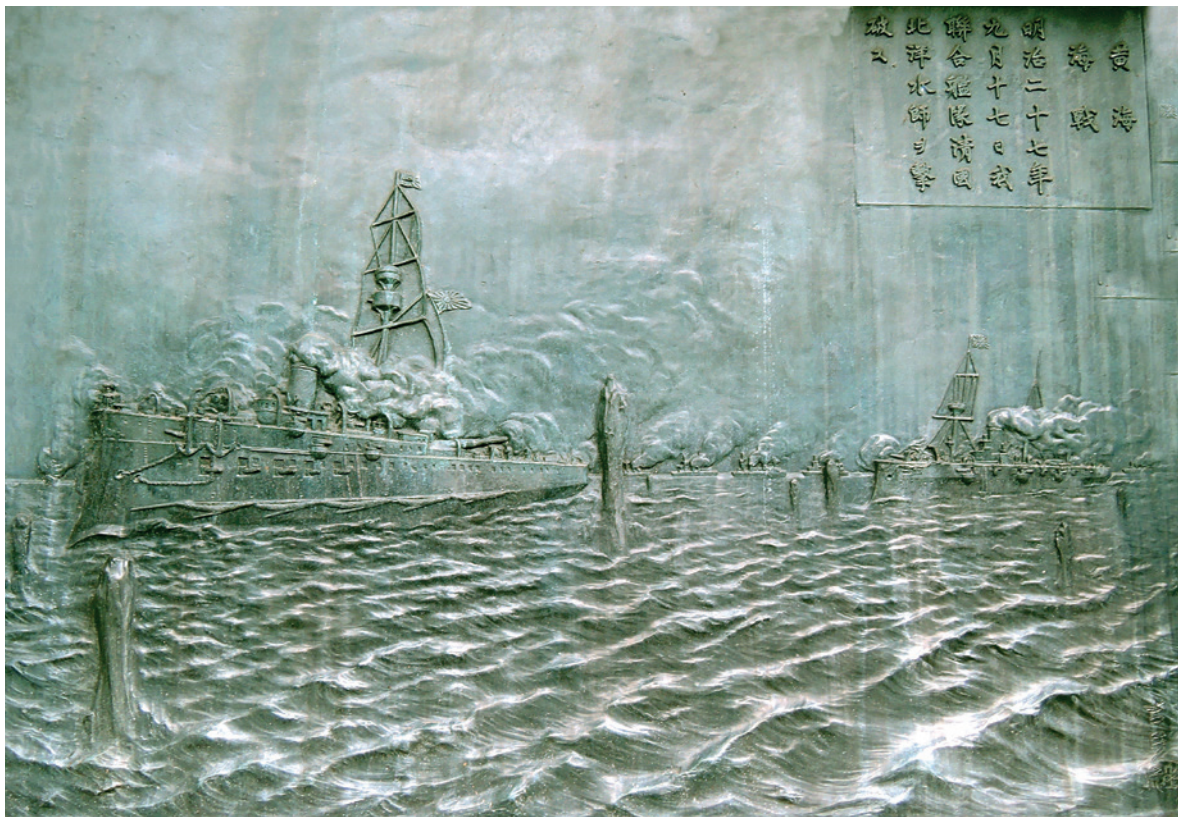
Japanese casualties at the Yalu River				
Ship	Killed		Wounded	
	Officers	Other ranks	Officers	Other ranks
<i>Akagi</i>	2	9	2	12
<i>Akitsushima</i>	2	4	–	10 (1*)
<i>Chiyoda</i>	–	–	–	–
<i>Fusō</i>	–	4	2 (1)	8 (2)
<i>Hashidate</i>	–	3	–	9
<i>Hiei</i>	3	17	–	33 (4)
<i>Itsukushima</i>	–	14	1 (1)	11
<i>Matsushima</i>	3	54	–	56 (22)
<i>Naniwa</i>	–	–	–	–
<i>Saikyō Maru</i>	–	–	1 (1)	10
<i>Takachiho</i>	–	1	–	2 (1)
<i>Yoshino</i>	1	1	–	9
Total	11	107	6 (3)	160 (30)
* Numbers in parentheses indicate sailors who later died of their wounds				

The Chinese sank no Japanese warships but seriously damaged four, causing 284 (some say 298) Japanese casualties in the process. *Matsushima* suffered the worst single-ship loss, incurring 113 casualties after being hit by a heavy Chinese round. *Hiei* was severely damaged and retired from the battle; *Akagi* suffered heavy Chinese gunfire, but incurred no great loss of life. Urged on by Vice-Admiral Kabayama despite its lack of offensive armament, the armed merchantman *Saikyō Maru* was hit by four 305mm shells, but managed to stay afloat with only 11 wounded.

GUNNERY

In terms of gunnery accuracy, *Dingyuan* and *Zhenyuan*'s massive 305mm main guns fired a total of 217 rounds (*Dingyuan* 120; *Zhenyuan* 97), but only nine confirmed hits are recorded (*Saikyō Maru* 4; *Fusō* 2; *Matsushima* 2; *Hiei* 1). This equates to a hit rate of only 4.1 per cent. The Japanese 320mm Canet gun fared better, achieving two hits (*Dingyuan* 1; *Zhenyuan* 1) out of a total of 13 shots fired from three ships (*Matsushima* 4; *Itsukushima* 5; *Hashidate* 4) in 5 hours – a hit rate of 15.3 per cent. As well as offering a slow rate of fire, the 320mm guns were less than impressive in terms of penetration power. In a pre-war test, at 8,000m the 320mm shell could penetrate only 334mm of wrought-iron armour if it was mounted vertically.

The battle of the Yalu River in 1894 was commemorated in a lead bas-relief in the Yasukuni Shrine in Tokyo. [Author]



Chinese gunfire statistics		
Ship	Large-calibre shots fired (100mm+)	Total
<i>Chaoyong</i>	?	?
<i>Dingyuan</i>	120 (305mm); 100 (150mm)	220
<i>Fulong</i>	?	?
<i>Guangbing</i>	?	?
<i>Guangjia</i>	?	?
<i>Jingyuan</i>	?	?
<i>Jingyuan (CY)</i>	103 (210mm); 30 (150mm)	133
<i>Jiyuan</i>	35 (210mm and 150mm)	35
<i>Laiyuan</i>	30 (210mm); 28 (150mm)	58
<i>Pingyuan</i>	10 (260mm); ? (150mm)	?
<i>Yangwei</i>	?	?
<i>Zhenyuan</i>	97 (305mm); 148 (150mm)	245
<i>Zhiyuan</i>	?	?
Total		691 (total ~1,000)

While both sides' main guns performed poorly, a key contribution was made by the smaller-calibre QF guns. If we look at the gunnery accuracy of both sides, the Chinese actually had a better hit rate than the Japanese. The Japanese consumed

Hits incurred by Chinese ships				
Ship	Main-gun and QF hits	Small-calibre hits (57mm or less)	Total	Fate
<i>Chaoyong</i>	~15	~20	~35	Sunk 1894
<i>Dingyuan</i>	~99	~60	~159	Scuttled 1895
<i>Fulong</i>	0	0	0	Captured 1895
<i>Guangbing</i>	1	0	1	Captured 1895
<i>Guangjia</i>	0	?	?	Scuttled 1894
<i>Jingyuan</i>	~40	~50	~90	Sunk 1894
<i>Jingyuan (CY)</i>	~70	~40	~110	Sunk at Weihaiwei 1895
<i>Jiyuan</i>	5	10	15	Captured 1895
<i>Laiyuan</i>	~10	~10	~20	Sunk at Weihaiwei 1895
<i>Pingyuan</i>	~19	~5	~24	Captured 1895
<i>Yangwei</i>	~15	~20	~35	Sunk 1894
<i>Zhenyuan</i>	~40	~40	~80	Captured 1895
<i>Zhiyuan</i>	~30	~40	~70	Sunk 1894
Total	~344	~295	~639	

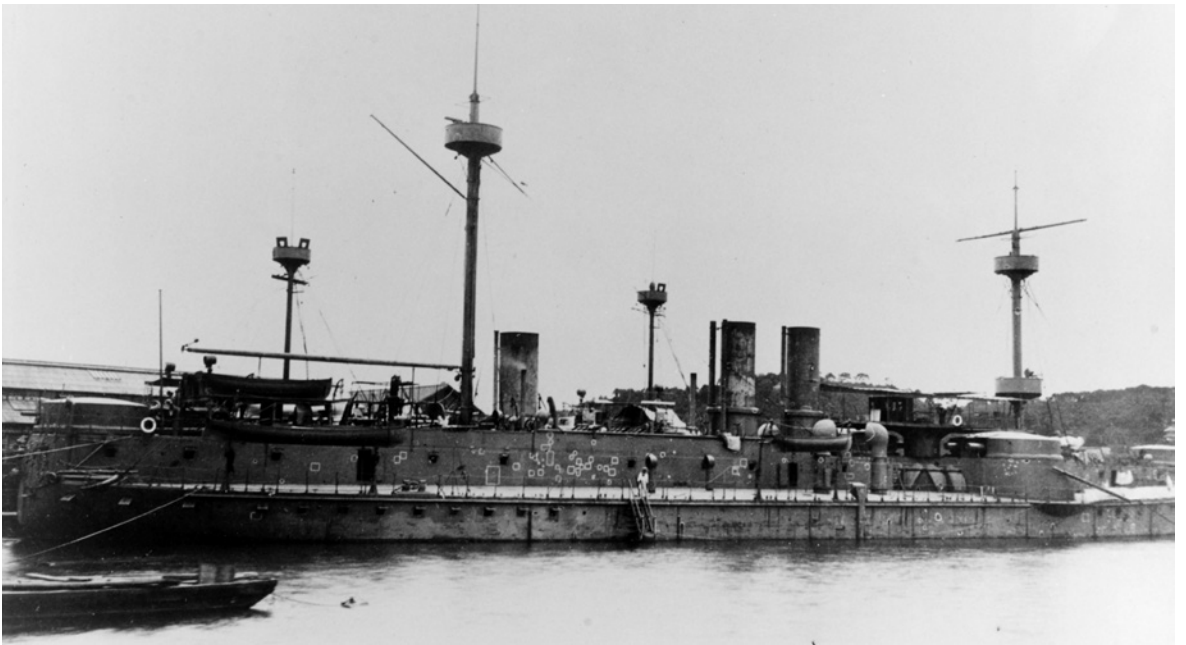
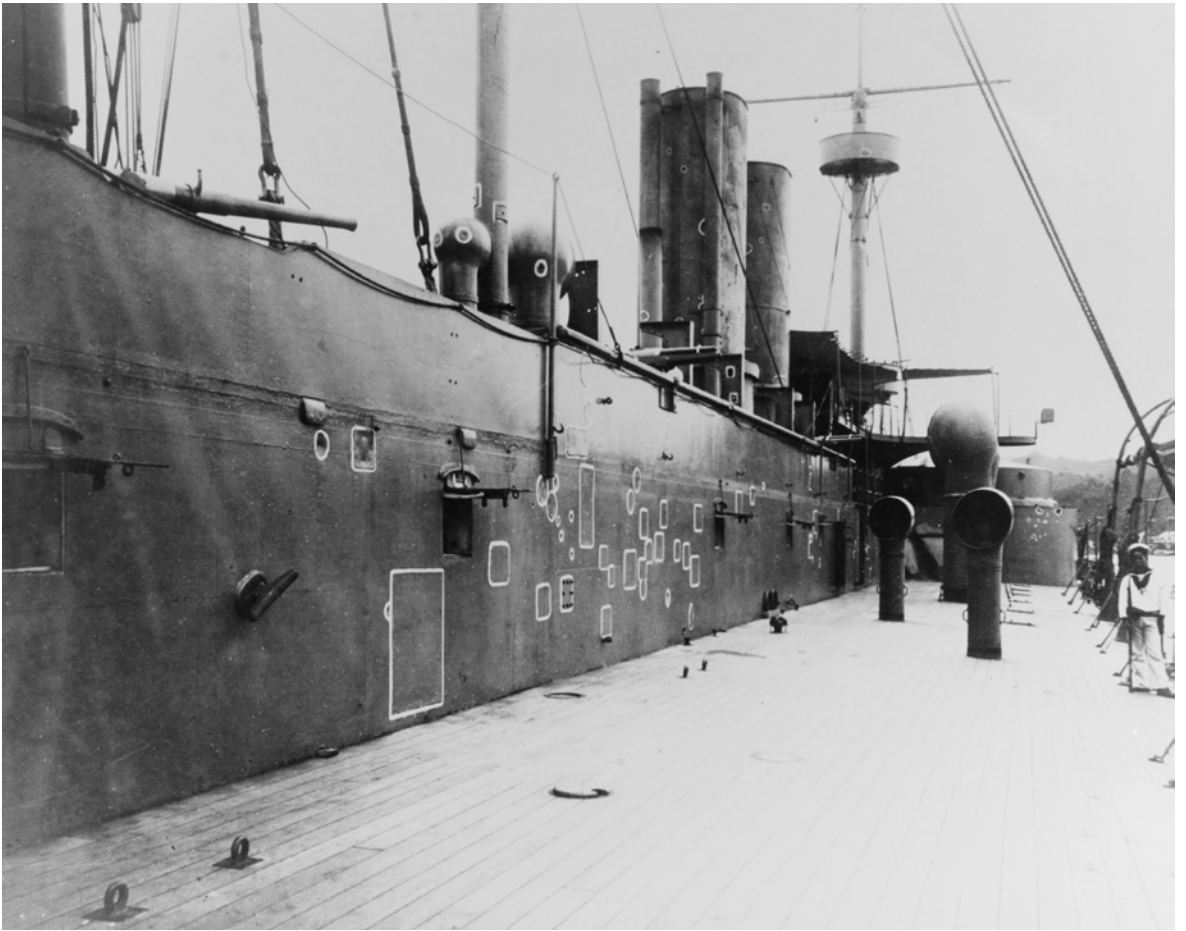
Japanese gunfire statistics				
Ship	Shots fired			Total
	Main	QF	Small	
<i>Akagi</i>	61	347	0	408
<i>Akitsushima</i>	0	922	562	1,484
<i>Chiyoda</i>	0	1,364	0	1,364
<i>Fusō</i>	197	164	1,553	1,914
<i>Hashidate</i>	4	1,451	0	1,455
<i>Hiei</i>	81	0	4,500	4,581
<i>Itsukushima</i>	5	1,655	239	1,899
<i>Matsushima</i>	4	1,096	200	1,300
<i>Naniwa</i>	157	258	2,168	2,583
<i>Saikyō Maru</i>	0	231	0	231
<i>Takachiho</i>	111	155	2,298	2,564
<i>Yoshino</i>	0	1,055	0	1,055
Total	620	8,698	11,520	20,838

almost double the amount of ammunition: *Matsushima*, *Itsukushima* and *Hashidate's* 120mm guns fired 410, 516 and 731 shots respectively, while *Dingyuan* and *Zhenyuan's* 150mm guns fired only 248 rounds in total. A key factor on the day was the overwhelming volume of fire the Japanese managed to unleash on the

Hits incurred by Japanese ships				
Ship	Large-calibre hits (100mm+)	Small-calibre hits (57mm or less)	Total	Fate
<i>Akagi</i>	12	18	30	Sunk by typhoon 1945
<i>Akitsushima</i>	4	0	4	Scrapped 1927
<i>Chiyoda</i>	1	2	3	Sunk as target ship 1927
<i>Fusō</i>	3	2	5	Sold off 1909
<i>Hashidate</i>	3	8	11	Scrapped 1927
<i>Hiei</i>	19	4	23	Sold off 1921
<i>Itsukushima</i>	4	4	8	Scrapped 1926
<i>Matsushima</i>	7	6	13	Accidental explosion 1908
<i>Naniwa</i>	4	5	9	Scrapped 1912
<i>Saikyō Maru</i>	8	0	8	Scrapped 1927
<i>Takachiho</i>	2	3	5	Torpedoed 1914
<i>Yoshino</i>	6	4	10	Collision 1904
Total	73	56	129	

OPPOSITE

Two views of *Zhenyuan* being refitted in dry dock after the ship was captured by the Japanese. The white chalk marks indicate hits on the ship for which repairs are needed. After *Zhenyuan* was captured, it entered IJN service and was the IJN's only battleship until the commissioning of HIJMS *Fuji* in 1897. [NH 88892 and NH 88889 courtesy of the Naval History & Heritage Command]



Chinese ships. The Japanese had total superiority in terms of QF guns: 192 vs 27. Furthermore, the Japanese also had better gunnery discipline. They never fired their main guns at ranges greater than 3,000m and if possible tried to get the range down to 2,000–3,000m to increase the chances of a hit. Firing at ranges greater than 5,000m was simply a waste of ammunition and demonstrated that the Chinese – especially Admiral Ding and Captain Liu Bu-chang – had no understanding of modern gunnery. By contrast, the Japanese held their fire until they were sure of a hit. As far as the Japanese were concerned, the British QF guns won the battle – so much so that Sir William Armstrong, who supplied all the QF guns on board the ships of the IJN's Combined Fleet, was awarded the Order of the Rising Sun, 2nd Grade. Without Armstrong's guns, there could not have been a Japanese victory.

AMMUNITION

Another factor contributing to the Chinese defeat at the Yalu River was the quality and quantity of the Beiyang Fleet's ammunition. *Dingyuan* expended all its 305mm rounds, and *Zhenyuan* had only 25 rounds left at the end of the battle; neither vessel had any 150mm ammunition left by the end of the battle. In theory, each of the 305mm turrets should have had 100 rounds, making a total of 400 rounds for the two ironclads, but in practice, only 217 rounds were available in total, and all were expended during the battle. The Chinese ammunition was deficient not only in terms of the warheads, but also the bag charge. After the battle, *Pingyuan*'s 260mm gun still had 35 rounds left, but the ship could not have fired off the remaining rounds due to lack of propellant.

The Chinese lack of high-explosive shells was also a key factor at the Yalu River. The best estimate gives a total of 217 305mm high-explosive shells, which equates to 27.1 rounds per barrel, hardly adequate for a major sea battle. If the round that hit *Matsushima* and caused 84 casualties had been a high-explosive round and not a solid-shot armour piercing round, the final result of the battle might not have been so one-sided.

OPPOSITE

After entering IJN service, *Zhenyuan* was modernized in 1897. Note the thickness of the extra armour and modified armament: more QF guns, the removal of the torpedo-boat stations and the replacement of the aft Krupp gun with a 150mm QF gun and the bow Krupp gun with the same, but retaining the turret. (NH 1597 courtesy of the Naval History & Heritage Command)

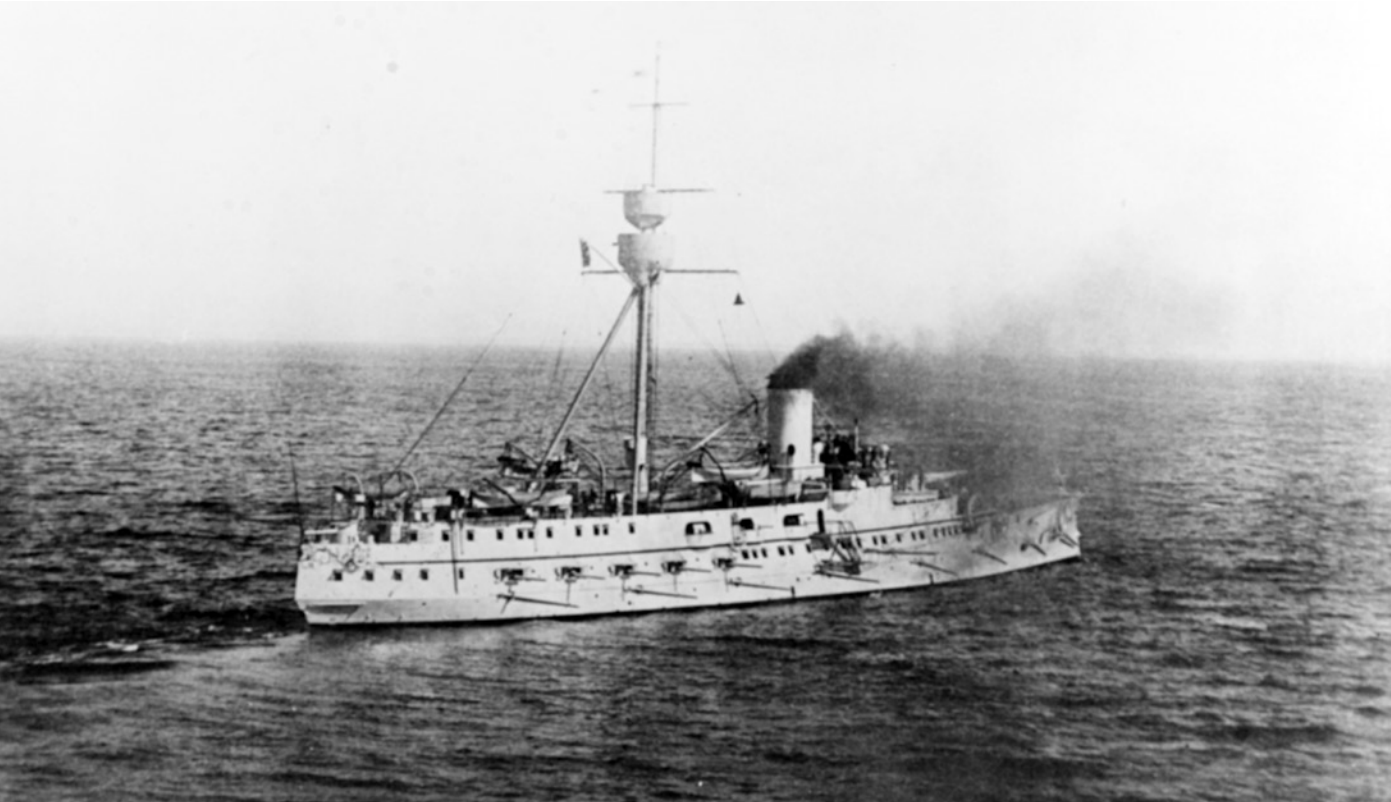
MOBILITY

Aside from the effect of gunnery, superior speed and manoeuvrability were also key battle-winning factors for the Japanese. In terms of speed, the four protected cruisers of the Japanese Flying Squadron – *Akitsushima*, *Naniwa*, *Takachiho* and *Yoshino* – were superior to anything the Chinese had in service. They were able to wreak havoc among the Beiyang Fleet and contributed to the break-up of Admiral Ding's formation early on in the battle. The four vessels of the Flying Squadron had a total of 90 QF guns: four 152mm, 12 120mm, 42 47mm, 20 25mm and 12 11mm. In the tables we can see that the four ships of the Flying Squadron accounted for 36 per cent of the total

Japanese firepower; but more importantly, they (in reality, only two ships – *Takachiho* and *Naniwa*) accounted for 40 per cent of the large-calibre rounds fired. The Flying Squadron was the epitome of *Jeune École*, combining high speed with tremendous firepower.

Maximum speed			
Japanese	Speed	Chinese	Speed
<i>Akagi</i>	10kn	<i>Chaoyong</i>	15kn
<i>Akitsushima</i> *	19kn	<i>Dingyuan</i>	14.5kn
<i>Chiyoda</i>	19kn	<i>Fulong</i>	24.2kn
<i>Fusō</i>	13kn	<i>Guangbing</i>	17kn
<i>Hashidate</i>	16kn	<i>Guangjia</i>	17kn
<i>Hiei</i>	13.2kn	<i>Jingyuan</i>	15.5kn
<i>Itsukushima</i>	16kn	<i>Jingyuan (CY)</i>	18kn
<i>Matsushima</i>	16kn	<i>Jiyuan</i>	15kn
<i>Naniwa</i> *	19kn	<i>Laiyuan</i>	15.5kn
<i>Saikyō Maru</i>	15kn	<i>Pingyuan</i>	14.5kn
<i>Takachiho</i> *	18kn	<i>Yangwei</i>	15kn
<i>Yoshino</i> *	23kn	<i>Zhenyuan</i>	14.5kn
* Ships of the Flying Squadron		<i>Zhiyuan</i>	18kn

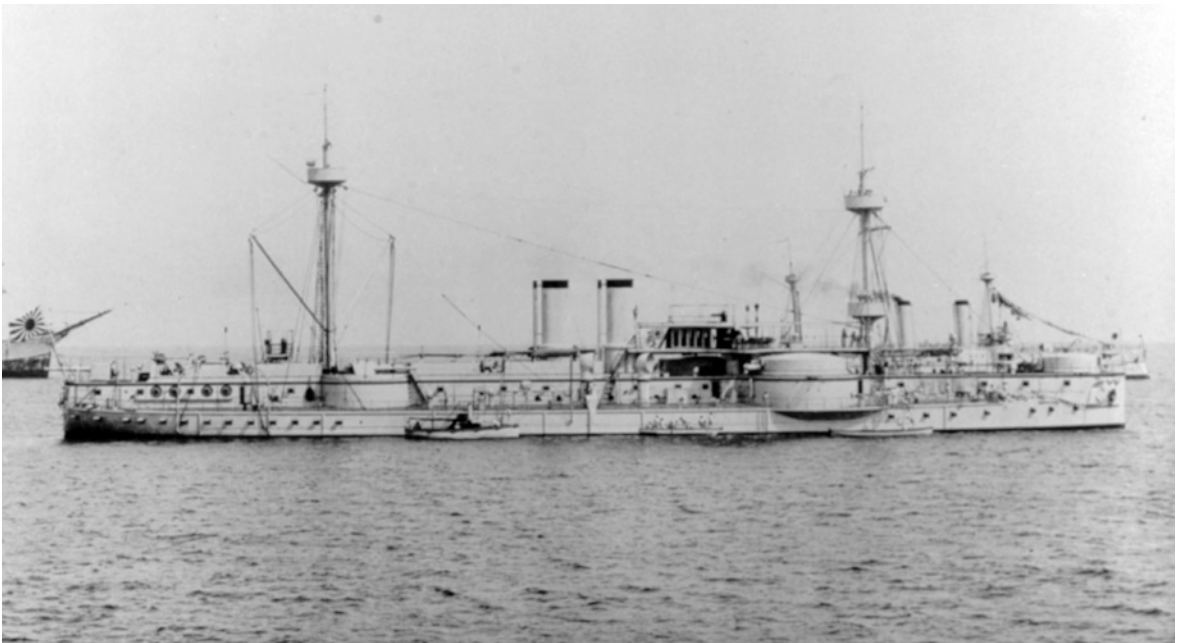
Hashidate is under way in this photograph, published in 1905. The ship served in the battles of the Yellow Sea (10 August 1904) and Tsushima (27–28 May 1905) during the Russo-Japanese War and survived into the 1920s, being scrapped in 1927. [NH 74394 courtesy of the Naval History & Heritage Command]

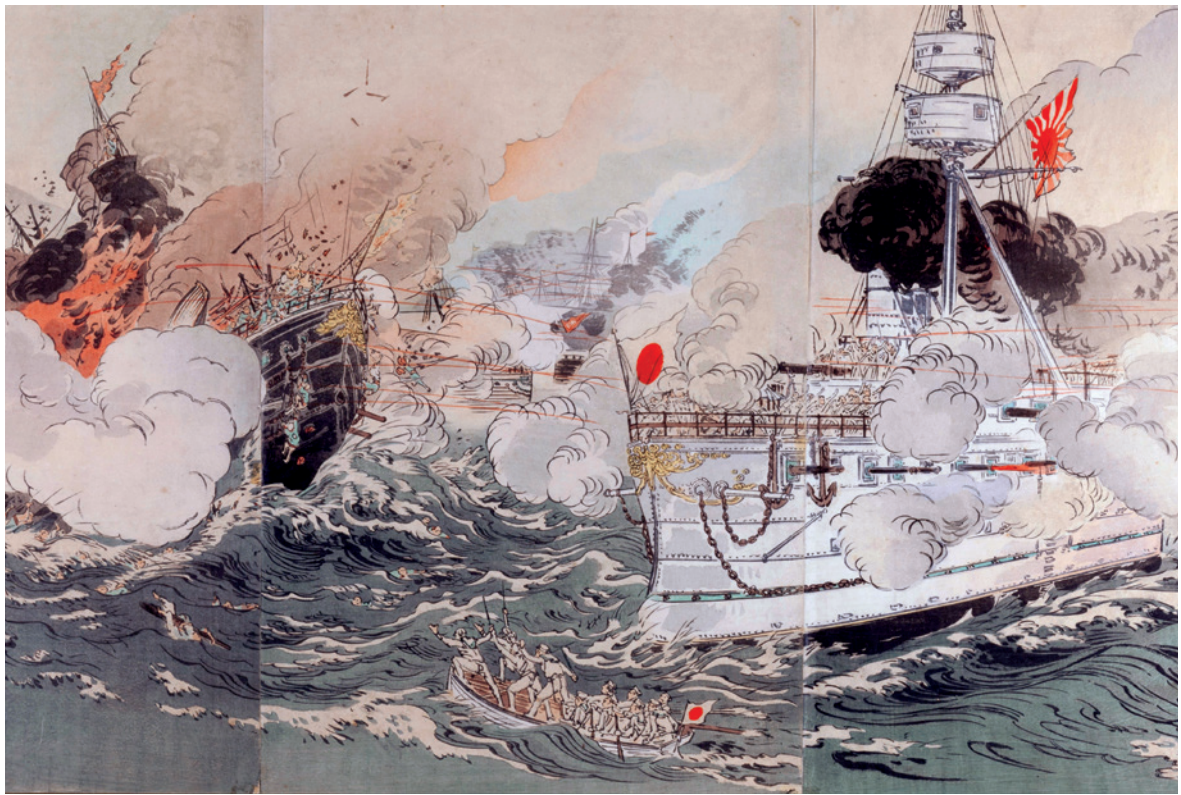


AFTERMATH

The defeat of the Beiyang Fleet at the Yalu River was a major propaganda victory for Japan, with many major European newspapers providing front-page coverage and attributing Japan's victory to its rapid assimilation of Western methods and technology. Some military analysts, however – notably Hilary A. Herbert, the US Secretary of the Navy – called the battle ‘nearly a draw’ (Herbert 1894). Although the Chinese had lost

Another view of *Zhenyuan*, published in 1905. Despite being obsolete by the time of the Russo-Japanese War, *Zhenyuan* participated in the blockade of Port Arthur, as Lüshunkou was named by the Russians. (NH 74378 courtesy of the Naval History & Heritage Command)





The battle of the Yalu River was a key moment in Japanese military history, and is depicted in many illustrations of the period. The small boat at the foot of this 19th-century painting of the battle by the Japanese artist Gekkō Ogata (1859–1920) is a mystery, for no written account mentions this episode. [Gekkō Ogata/Wikimedia/Public Domain]

several warships, Japanese ships had also suffered considerable damage, and if the quantity and quality of Chinese ammunition had been better, the outcome of the battle might have been different.

On 17 April 1895, Li Hong-zhang was forced to sign the humiliating Treaty of Shimonoseki. The Chinese lost Korea and ceded the Liaodong Peninsula – including the vital port of Lüshunkou – to Japan, along with Taiwan and the Penghu Islands, both of which were also ceded to Japan ‘in perpetuity’. Despite this not being specified in the treaty, Japan took the opportunity to annexe the Diaoyu Islands (known as the Senkaku Islands to the Japanese), laying the foundation of today’s dispute between Japan and China in the East China Sea (Taiwan also claims the islands). Critically, China was made to pay 200 million Taels of silver as war reparations. If war trophies carried off to Japan are included, this windfall amounted to 340 million Taels of silver to Japan – equivalent to about 6.4 times the Japanese government’s yearly revenue for 1894. Also, China was forced to give Japan ‘most favoured nation’ status for all trade, permitting Japanese ships and merchants to operate without any hindrance on the Yangtze River.

Japan’s ambitions caused concern in the West. Russia, Germany and France duly intervened and forced Japan to give up the Liaodong Peninsula and Lüshunkou to China in exchange for a further 30 million Taels of silver, thereby bringing Japan’s windfall to the equivalent of eight years’ Japanese government income. With this money, Japan invested in building up its military-industrial complex, laying the foundation that would enable Japan to wage war across Asia in the next 50 years.

Twenty years after the assassination of the Japanese politician Itō Hirobumi on 26 October 1909, the world finally got to know how the Japanese were able to achieve such devastating victories over the Chinese: like the success Britain had with decoding Axis signals intelligence during World War II, the Japanese had by 1888 broken the Chinese diplomatic codes and were thus able to anticipate every move the Chinese made.

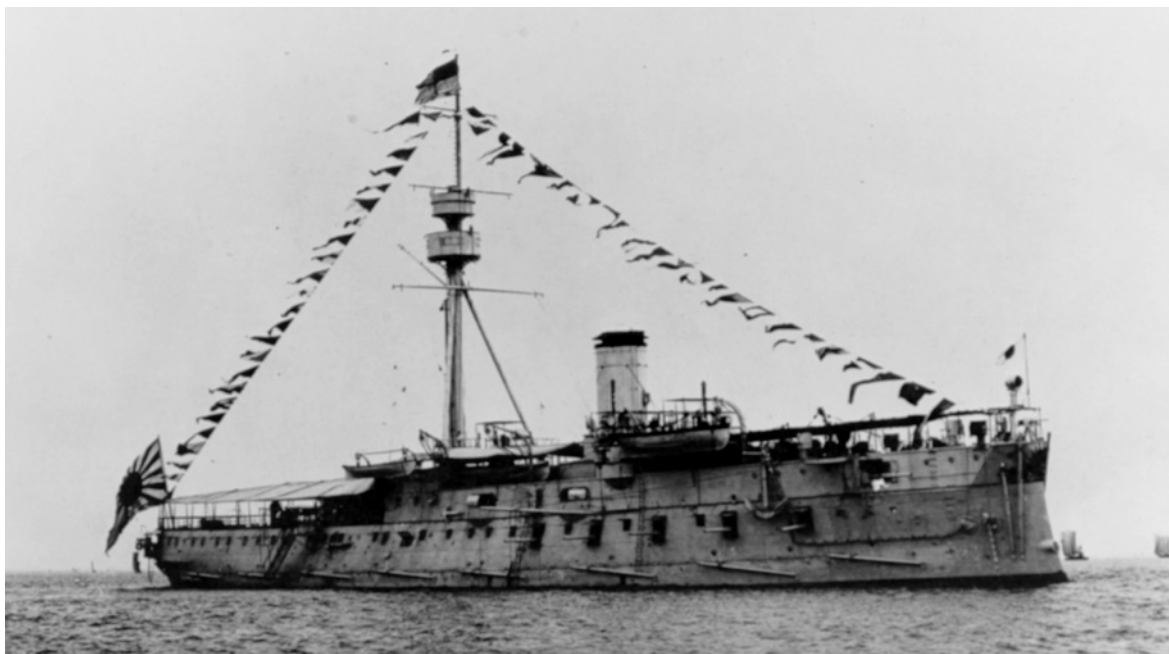
The Chinese in Taiwan resisted the Japanese and briefly declared the island to be the independent Republic of Formosa (May–October 1895), thus not subject to the Treaty of Shimonoseki. In a five-month campaign, the Japanese defeated the Chinese and incorporated the island as a Japanese colony; the Japanese occupation ceased only in 1945 following the total defeat of Japan in World War II.

Britain's Admiral John 'Jackie' Fisher was especially impressed by the ideas of *Jeune École* and felt that the combination of fast raiders and torpedo boats made the traditional battleship too unwieldy. Therefore he argued that the future lay with fast ships fitted with light armour and big guns, better known as the battlecruiser concept. To counter the *Jeune École* concept of warfare, large capital ships would need to be protected not only by QF guns but by an outer screen of 'torpedo boat destroyers', the first of which was HMS *Rattlesnake* in 1886.

The humiliation suffered by China in 1894 is still seen as a key moment in modern Chinese history – so much so that the Chinese government sanctioned the construction of a full-sized replica of Ding's flagship, *Dingyuan*, which today serves as a floating museum.

Dingyuan was scuttled at Weihaiwei; the explosion occurred close to amidships, probably igniting the magazine. In 2003, to commemorate both the ship and the event, the Weihai Port Bureau invested US\$6 million in constructing a 1:1 replica of *Dingyuan* as a floating museum. This picture shows the replica armoured turret ship in 2014. (WANG ZHAO/AFP/Getty Images)





Matsushima as depicted in a 1905 publication. (NH 74392 courtesy of the Naval History & Heritage Command)

The Japanese were not at all happy with the Matsushima-class protected cruisers. As a result, no additional ships of this class were built; in fact, they were the last French-designed ships to serve in the IJN. The main reason for Japanese dissatisfaction was the poor performance of the Canet gun, hampered by its slow loading cycle and the lack of a means by which firing solutions could be computed, given that the battle of the Yalu River occurred before the mass deployment of Barr & Stroud rangefinding devices. During the battle, estimating ranges relied upon educated guesswork; furthermore, both ships – the firer and the target – moved at high speed, making calculation very difficult. Another factor damning the Matsushima-class design was that the Canet gun was far too big for the ship; a broadside including the Canet gun could seriously upset the vessel's equilibrium and stability.

While *Dingyuan* was scuttled by the Chinese themselves, *Zhenyuan* was captured by the Japanese and commissioned into the IJN. Because of the resounding defeats they suffered, the Chinese did not have the opportunity to review the battle, and as such there were no post-battle reviews on the performance of the Chinese ironclads. There was an attempt to rebuild the Beiyang Fleet with ships bought from Germany and Britain. In addition, naval students continued to be sent to Europe. In 1909 the various Chinese fleets were finally combined as one navy.

FURTHER READING

Since 1894 there has been much scholarly attention in China, Japan and elsewhere to the battle of the Yalu River and the First Sino-Japanese War. For space reasons, only accounts published in English are included here.

Verbally dictated to a journalist, McGiffin's account of the battle of the Yalu River contains many inaccuracies and should be read with caution. While Hanneken's account of his early life in China can be regarded as accurate, his later assessment of military operations in 1894–95 should be read with care, for he became increasingly bitter after his failure to continue his career as a military advisor. Furthermore, some have suspected that his account of the battle was based not upon his own observations, but newspaper reports.

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INDEX

References to illustrations are shown in **bold**.

Akitsuishima protected cruiser 22, 49, 52, 74: combat **52, 53, 54, 54, 55, 57, 58, 59, 67, 70, 72**
Almirante Lynch torpedo gunboat 12

Blanco Encalada armoured frigate 12

Camperdown battleship 37
Captain turret ship 35
Chaoyong cruiser 45, 50, 51, 52, 74: combat 35, **53, 54, 55, 57, 67, 69**
chase guns (Chi): 150mm 16, **17, 30, 32, 55, 59, 69, 70**
Chenhang transport boat 45
Chinese Navy 35

Beiyang Fleet 2, 8, 9, 18, 20, 24, 26, 30, **44, 50, 62**:
cadet/officer training 26, 42, 48–49; composition/
strength 8, 21, 22, 25, 50; decline/destruction
47, 49, 62, 63, 64–65; foreign advisors/officers
43, 44–46, 49; formation/funding of 8, 23–24,
42, 43; primary role of 6, 26
composition/size 18, 25
evolution of 15, 16–17, 21, 23–24
Fujian/Guangdong fleets 18, 25
Lay-Orsborn Flotilla 15, 16, 43
Nanyang Fleet 18, 24, 25
Northern Naval Squadron 8, 23, 42, 43
officers, calibre of 43, 44, 46
sailors, calibre of 21, **42, 43–44**
Chiyoda protected cruiser 22, 48, 52, 74: combat **53, 54, 54, 57, 59, 67, 70**

Deng Shi-chang, Capt 42, 45, 51, 56, 58
Ding Ru-chang, Adm 2, 20, 26, 43, **44, 45, 47, 50, 51, 52, 54, 62, 63, 64, 65, 72, 77**
Dingyuan armoured turret ship **4, 8, 15, 16, 17, 18, 22, 25, 35, 42, 43, 48, 50, 51, 52**: armament 2, 14, 16, **17, 29, 30, 32, 44, 54, 55, 59, 68, 70**; combat 2, 9, 44, 45, **53, 54, 54, 55, 56, 57, 59, 65, 67, 68, 69, 70, 72, 77**; design/features 4, 14, 16, 17, 32, 37–38, 42; performance/specifications 16, 18, 39, 40, 41, 74; replica 77, 77

Esmeralda protected cruiser 13, 19

Feisheng troop carrier 26
Fuji battleship 71
Fusō ironclad 20, 22, 47, 52, 74: combat **53, 54, 55, 57, 59, 67, 68, 70**

Greenwich, RNC 26, 42, 48, 49
Guangia cruiser 50, 51, 52, 74: combat **53, 57, 58, 59, 67, 69**

gunboats (Chi)
Amoy/*Chi Kiang*/*China*/*Dai Ching* 15
Guangbing 26, 50, 51, 74: combat **53, 57, 58, 62, 65, 67, 69**; IJN service 24–25, **24, 65**
Kiang Sool/*Kwangtung*/*Peking* 15
Pingyuan 50, 51, 74: armament 58, 59, **60–61**:
combat **53, 57, 58, 60–61, 62, 65, 67, 69, 72**
Tientsin 15
Zhenbei (*Delta*) 42, 43, **43, 65**
Zhenbian/*Zhenhong* 50, 65
Zhendong (*Alpha*)/*Zhennan* (*Beta*) 43, 50, 62, 65
Zhenxi (*Gamma*) 43, 65
Zhenzhong 62, 65
gunboats (Jpn)
Akagi 52, 54, 55, 74: armament **55**; combat **53, 53, 54, 55, 57, 67, 68, 70**
Uryō 5

Hanneken, Constantin von 17, 44, 45, 52, 54, 63
Hashidate protected cruiser 20, 22, 48, 49, 52, 62, **66, 74**, 74: armament 20, **30, 66, 68, 70**; combat 47, **53, 54, 54, 57, 59, 67, 68, 70, 74**

Hercules ironclad battleship 35, 42
Hidaka Sōnojō, Vice-Adm **49, 52**
Hiei ironclad corvette 20, 47, 52, 55, 74: combat **53, 54, 55, 57, 67, 68, 70**

Imperial Japanese Navy 8, 12, 14, 19, **46, 48**
cadet/officer training 19, 20, 48, 49
Combined Fleet 2, 6, 9, 14, 26, 47, 64
evolution/growth of 8, 14, 18–21, 23
Flying Squadron 2, 35, 36, 39, **53, 54, 56, 57, 59, 62, 72, 74**
foreign advisors 18–19, 49
Main Squadron **53, 54, 55, 57, 59, 62**
naval districts of 22
reservists 47, 48
Standing (Readiness) Fleet 22, 26, 47
strength (Sept 1894) 21–22, 48
Western Fleet 22

Inflexible ironclad battleship 16, 17, 18
Intibah steamer 12
Irene troop carrier 26
Itō Sukeyuki, Fleet Adm 2, 24, 25, 47, 48, 49, **49, 51, 54, 62, 65**
Itukushima protected cruiser 20, 22, 52, 74: armament 2, 20, 30, 68, 70; combat **1, 53, 54, 57, 59, 68, 70, 67, 70**
Izumi protected cruiser **19**

Jeune École concept 10–11, 20–21, 40, 74, 77
Jingyuan protected cruiser 22, 50, 51, 74: combat 6, 40, **53, 57, 57, 59, 67, 69**
Jingyuan (*CY*) protected cruiser 22, 50, 51, 74: combat 36, **53, 55, 57, 59, 62, 65, 65, 67, 69**
Jiyuan protected cruiser 26, 50, 51, 74: combat 36, 44, **53, 57, 58, 59, 65, 67, 69**; IJN capture/service (*Saien*) **25**

Kabayama Sukenori, Vice-Adm **49, 54, 68**
Kamimura Hikonojō, Vice-Adm **49, 52**
Kasuga armoured cruiser 40
Kongo ironclad corvette 20
Korea, fighting for 4–6, 8, 9, 23, 25–26, 50, 62, 76
Koushing troop carrier 6, **6, 9, 26, 45, 50**

Laiyuan protected cruiser 22, 50, 51, 74: combat 40, **53, 55, 57, 59, 62, 65, 67, 69**

Li Hong-zhang, Viceroy **8, 17, 18, 20, 24, 25–26, 41, 42, 43, 45, 48, 62, 64, 76**

Lissa, battle of (1866) **11, 14**

Liu Bu-chan, Adm 42–43, 51, 59, 65, 72

Lüshunkou, Beiyang Fleet to 16, 62; fighting for 9, **27, 45, 63–64, 63, 76**

main guns (Chi): 210mm 69; 260mm 44, 58, 59, **60–61, 69, 72**; 305mm 2, 13, 16, 17, **29, 30, 32, 44, 54, 55, 59, 68, 69**

main guns (Jpn) 69, 70, 72: 320mm 20, **21, 28, 29, 30, 30, 36, 59, 60–61, 68, 72**

Matsushima protected cruiser 4, **5, 8, 14, 20, 21, 22, 22, 51, 52, 78**: armament 2, 13, 20, **21, 28, 30, 32, 38, 40, 59, 60–61, 68, 70**; combat 9, 28, 38, 47, **52, 53, 53, 54, 55, 57, 58, 59, 60–61, 62, 67, 68, 70**; design/features 5, 14, 20, **21, 30, 39**; performance/specifications 20, 30, 38, 39, 40, 74
McGiffin, Philo Norton 44–46, 49, 54, 58
'mosquito boats' (Chi) 16–17, 23, 42

Naniwa protected cruiser 20, 22, 47, 49, 52, 74: armament 12, 36, 44; combat 12, 36, 44, 45, **53, 54, 54, 55, 57, 58, 59, 67, 70, 72, 74**

Pao Hua auxiliary tug 65
Pungdo, battle of (1894) 6, **6, 9, 26, 27, 47**
Pyongyang, battle of (1894) 9, 27, 50

QF guns 12–13, **13, 32, 77**
(Chi) 12, 55, 59, **60–61**: 37mm (rotary) 14, 30; 47mm 16; 57mm 16
(Jpn) 55, 56, 69–70, 72: 37mm (rotary) 20, **33**; 47mm 20, 30, **31, 40, 55, 66, 72**; 57mm **31**; 120mm 20, 28, 30, **31, 36, 40, 55, 59, 70, 72**; 150mm **40, 73**

rangefinders/rangefinding 35–36, **36, 37**

Re di Portogallo battleship **11**

Royal Navy 10, 15, 16, 17, 18, 19, 35, 37, 42, 46, 62

Sachsen ironclad frigate 18, **38, 39, 40, 41**
Saikyō Maru armed merchantman 52, 74: combat **51, 53, 54, 55–56, 57, 67, 68, 70**

Taiwan (Formosa), fighting for 9, 15–16, 23, 40, 45, 76, 77

Takachihō protected cruiser 22, 47, 52, 74: armament 36; combat 36, 45, **53, 54, 54, 55, 57, 59, 67, 70, 72, 74**

Tōgō Heihachirō, Adm 20, **49, 52**
torpedo boats (Chi)

Ding-onel/*Ding-two* **15, 16**
Fulong 50, 51, 74: combat **53, 56, 57, 58, 62, 67, 69**

Youer/*Yousan* 50, 62
Zhen-onel/*Zhen-two* 16
Zuoyi **14, 50, 51**: combat **53, 57, 58, 62**

torpedoes, development/use of 12, 16, 32, 33, 35–36, **39, 41, 56**: 'Blackhead' (Schwartzkopf) 14, 20, 30, **33, 34–35**; Whitehead 34, 35

Tsuboi Kōzō, Vice-Adm 26, 47, 54

Victoria battleship 37

Weihaiwei, battle of (1905) 9, 26, **27, 33, 45, 47, 63, 63, 64–65, 64, 65, 69, 77**
Weiyuan ironclad 48, 65

Yalu River, battle of the (1894) 9, 26, **27, 50–52, 56, 56, 58, 68, 75–76, 76**
battle formations/tactics (Chi) 9, 14, 45, 51, **51, 52, 53, 53, 54, 56, 57**
battle formations/tactics (Jpn) 14, 19, 38–39, 48, **53, 54, 57**

casualties (ships' crews) 47, 67, 68
gunfire statistics 34, 36, 44, 68–70, 72
prelude to/start of 50–51, 54
ship losses 57, 59, 66, 67

Yangwei cruiser 45, 50, 51, 52, 74: combat 7, 35, **53, 54, 55, 57, 58, 67, 69**

Ye Zu-Gui Li, Capt 51, 59, 62

Yoshino protected cruiser 22, 34, 37: armament 12, **40, 56**; combat 2, 12, 35, 40, 45, 47, **53, 54, 54, 55, 56, 57, 59, 67, 70, 72**; performance 38, 39, 74

Zhenyuan armoured turret ship 16, 22, 25: armour 72, 73; armament 14, 59, 68, 70, 72, **73**; combat 2, 12, 18, 45–46, 47, 50, 51, 52, **53, 54, 54, 56, 57, 59, 62, 65, 67, 68, 69, 70, 72**; design/features 38, 42; IJN capture/use 37, 65, 71, 72, **73, 75, 75**

Zhiyuan protected cruiser 22, **41, 42, 50, 51, 74**: combat 40, 45, **53, 56, 57, 57, 58, 67, 69**

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Front cover: Just after 1210hrs on 17 September 1894, the Chinese Beiyang Fleet lifted anchor not far from the mouth of the Yalu River, after overseeing a rather disorganized landing of Chinese troops. When the Japanese Combined Fleet finally spotted the Chinese after searching for days without success, the battle of the Yalu River began. The Chinese fleet rapidly moved west-south-west to engage the Japanese fleet in a staggered file formation with HICMS *Dingyuan* (above) as the flagship leading the southern file and HICMS *Zhenyuan* leading the northern file. Facing the Chinese was Japan's Combined Fleet under Vice-Admiral Itō Sukeyuki. The Japanese fleet was also formed up in two squadrons, both in a crescent shape and steaming roughly north-west, trying to cut off the Chinese. The Japanese were trying to manoeuvre themselves to meet the enemy in a classic crossing of the 'T', not unlike the opening moves of the battle of Trafalgar in 1805. To counter this, Admiral Ding Ru-chang, the Chinese commander, signalled to change formation and move the fleet, turning due south into an arrowhead formation with *Dingyuan*, the flagship, at the apex. At 1250hrs, just as the two fleets closed to a range of about 5,700m, *Dingyuan* fired one of its massive 305mm main gun across the starboard bow, narrowly missing HIJMS *Yoshino*, the leading ship of Japan's Flying Squadron. Leading the Japanese Combined Fleet was HIJMS *Matsushima* (below), the lead ship of the Main Squadron. The Chinese fleet was over 6,000m away, out of range of *Matsushima's* guns, but nevertheless, the Japanese ship turned its main gun to starboard to face the enemy, ready to shoot when the distance narrowed.

Dedication

To Faith Ying Lai – may this book stir your enthusiasm for greater knowledge about history; and to Graeme Heron, who took the time to drive me around in Newcastle upon Tyne, for being such a fine host.

Author's note

Throughout this book, I have used the Pinyin system, the current UN standard for modern Chinese transliteration. The only exception to the rule is for some key personalities where Giles-Wade or Yale Romanization system is better known. In writing Chinese and Japanese names, I follow the Asian naming system where the family name precedes the given name. In the 125 years since the battle, many of the names of the locations described in this book have changed. To enable the modern reader to follow the events more easily, I have appended modern geographical names to the names used in 1894–95. Chinese terms such as *guān dài*, meaning commander or captain, and *tídū*, meaning general or admiral, have been rendered as 'captain' and 'admiral' respectively.

Editor's note

For the most part, metric measurements are used in this book, with the exception of long tons, horsepower and knots. Where appropriate, calibres are given in the original imperial form with a metric conversion. The Tael, a Chinese unit of measurement, is equivalent to 31.25g.

Abbreviations

2IC	Second-in-Command
C-in-C	Commander-in-Chief
HICMS	His Imperial Chinese Majesty's Ship
HIJMS	His Imperial Japanese Majesty's Ship
IJN	Imperial Japanese Navy
IMCS	Imperial Maritime Customs Service (China)
kn	knot(s)
LoA	length overall
LWL	length at waterline
NNS	Northern Naval Squadron (China)
NYK	Nippon Yusen Kabushiki Kaisha (Japan Mail Shipping Line)
QF	Quick Firing
RBL	Rifled Breech Loading
RN	Royal Navy (Britain)
RNC	Royal Naval College (Britain)
RNR	Royal Naval Reserve (Britain)

Artist's note

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The publishers regret that they can enter into no correspondence upon this matter.

Title page photograph: This depiction of HIJMS *Itsukushima*, a Japanese protected cruiser of the same class as *Matsushima* but with its main gun pointing forward, is from a book published in 1905. During the battle of the Yalu River, *Itsukushima* was only able to fire its Canon gun five times, hitting the Chinese flagship *Dingyuan* four times and *Zhenyuan* once, without inflicting appreciable damage on either vessel. (NH 74393 courtesy of the Naval History & Heritage Command)